E. M. Baker

# The Monthly Review of the AMERICAN ELECTROPLATERS' SOCIETY

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SEPTEMBER 1940

# SPEAKING OF RECORDS
# HERE IS ONE

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- 2 REJECTS DUE TO PEELING.
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*This Is a Record of*

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# The MONTHLY REVIEW

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## *Editorial*

Now that the vacation season is over and the branches are starting the fall and winter activities, we are asking all members to cooperate with us as follows:

1. Help your Branch membership chairman in securing new members, using the invitation cards as much as possible.

2. Attend the meetings, enter into the discussions, bring your problems and have them discussed, so that you may receive the necessary help. And don't forget that the other fellow is being helped too.

3. Accept responsibility. You can help your branch by becoming an officer, reading a paper, serving on a committee and boosting the Society whenever the opportunity arises.

4. Help your publication. We need papers, articles of interest, abstracts, etc. Keep in mind also that we need more ads in the REVIEW. You can help greatly in this connection by suggesting to your supply house representative that his company should advertise in the REVIEW if he is not already an advertiser.

5. Make use of the REVIEW as a means of securing a position if you are out of work. This service is free to our members. Report to us positions that are open.

6. Branch Secretaries are asked to help us in eliminating non-essential items from the branch reports. We suggest instead a more complete account of the questions and answers discussed at the meetings. These should be carefully checked before being sent to us for publication.

This part of the branch Secretary's report is receiving considerable favor. Incidentally the Editor receives criticism if the answers are not correct, which proves to us that the REVIEW is being carefully read.

We are asking our Secretaries to send us all papers read at Branch meetings with the approval of the authors. If cuts are to be used with such papers, fine, we will gladly publish them.

We want to have reports from each branch each month. We have a very intelligent lot of Scribes in our branches this year. Now let's go to work and cooperate with the Editor.

We would like to know if there is any possibility of organizing a branch of the A.E.S. in the South. If someone who can speak with authority regarding this will write to us, we will appreciate whatever information can be given.

# A. E. S. Research

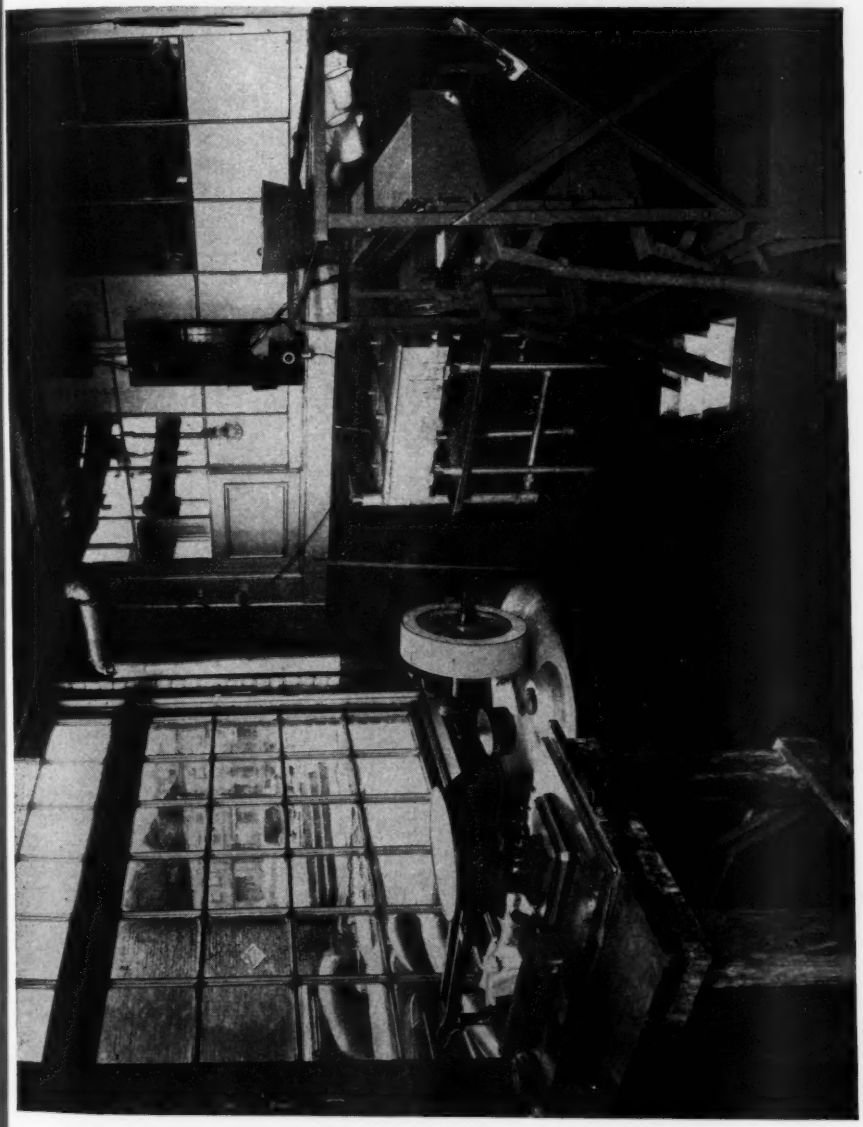
This is an attempt to keep you informed as to the progress of the research work.

As already reported, work on the new project was started shortly after July 1st and since that time both Mr. Lux, our Research Associate, and Dr. Blum have been busy with the many things attendant upon starting such work. This includes a myriad of things such as getting together the necessary materials, preparing equipment, investigating the published literature, working out the details of the program, etc.

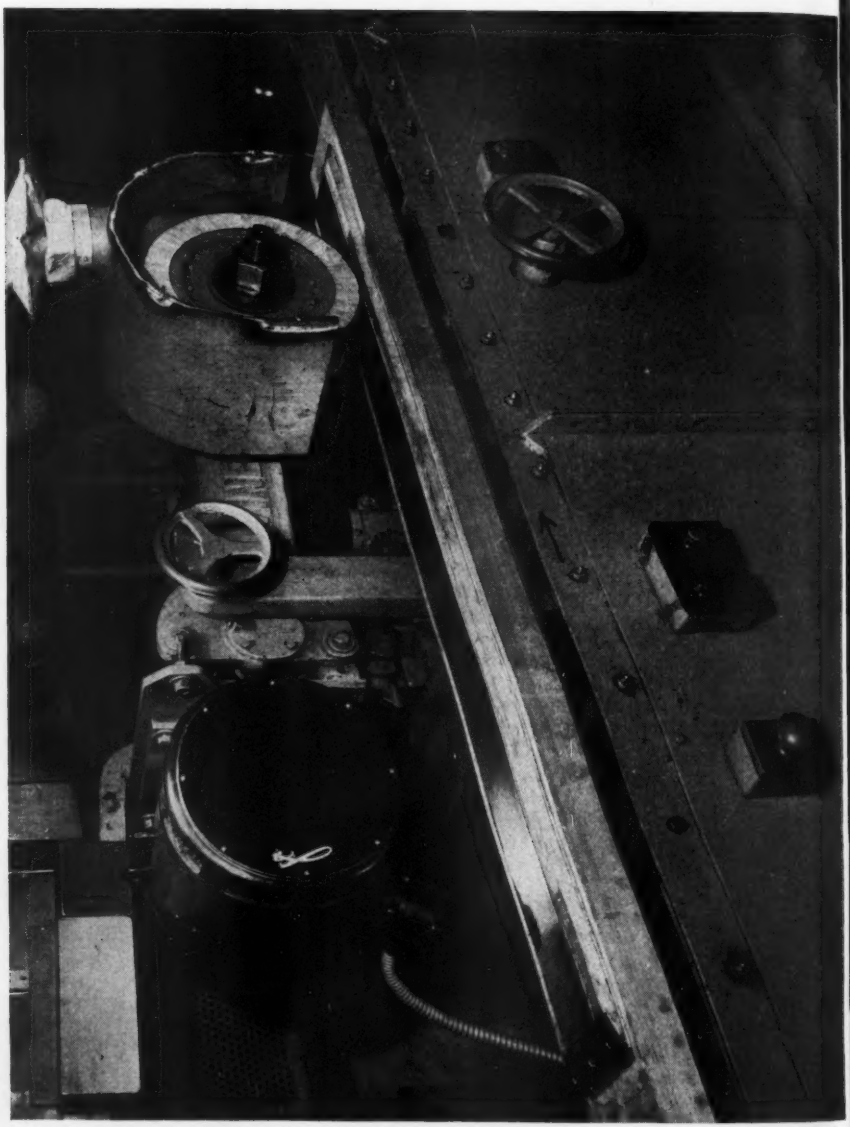
In addition to this, quite an amount of exploratory work has been done along the line of possible methods of measuring surface finish. Work has been done in this direction using the profilometer, reflectometer and metallographic methods. Some slight amount of polishing has been done toward determining just what procedures should be followed.

We have been very fortunate in that not only have the facilities of the Bureau of Standards been made available to us but also that we have been given the use of the experimental polishing department of Divine Bros. Co., Utica, N. Y., as well as their staff. This has a two-fold advantage, time and money. Polishing equipment could be set up at the Bureau at considerable cost to us after which certainly much time would be consumed and much expense incurred in gaining the necessary experience for carrying on this project. Through the courtesy of Divine Bros. Co. this has all been made available to us at no cost. The work, of course, is being supervised by Dr. Blum.

As the type of equipment and method of polishing may be of interest, two photographs are included. One shows the wheel set-up room including glue-pots against the far wall, wheel heading machine in front of the window and on the right an abrasive grain grading machine. On the spindle of the heading machine is a compressed canvas polishing wheel such as will be used in these tests. In the grain grader, the abrasive is placed in the hopper at the top from which it drops onto the inclined screen which is given a sharp, shaking movement. The fine grain goes through to the next finer screen, etc. until it reaches the bottom. The various grains held on the screens are led off through the tubes shown. This machine was furnished by the Exolon Co., Blaisdell, N. Y.,



who have also furnished the abrasive for these tests. The scale in the picture is used for weighing specimens before and after polishing.



The above photograph shows the mid-section of the single head straight line polishing machine. It also shows a strip steel specimen mounted for polishing. When polishing, the machine travels

in the direction indicated by the arrow. The front end of the strip is left free to take care of expansion. The rear end is clamped as shown and the whole piece is supported on a wooden platform with a heavy canvas pad immediately under the specimen. This permits shimming to assure a uniform pressure over the entire piece. A means is also provided for weighing the load on the head. The conveyor is reversible and the speeds of both wheel and conveyor are variable.

It is planned to polish the steel and rolled brass in strips and then cut them to the required size for plating.

It is expected that the polishing of the steel specimens will be started by October first. These will then be plated at the Bureau and such as require buffing will be buffed at Utica and at the same time polishing of the brass will be started. By dovetailing the work in this way it is expected that the specimens will be ready for exposure by some time next spring.

It seemed advisable that some of the panels for exposure should be plated with bright nickel. However, if this was to be done, the same bright nickel would have to be used throughout and as all of the bright nickels are proprietary this presented a problem. It did not seem advisable to arbitrarily select one and go ahead on that basis as that might be misinterpreted to mean that that particular nickel seemed best to the Research Committee. This might under some circumstances permit of unfavorable exploitation. Therefore, all of the companies marketing bright nickel solutions were approached, the circumstances were explained to them and they were asked whether it was agreeable to them that the selection of the solution to be used be made by drawing lots. They all replied in the affirmative. The names of the various bright nickel suppliers were placed in a hat and the selection was so made. The name drawn was Harshaw Chemical Co. The Research Committee does not imply that this solution is either better or worse than that of its competitors.

While this report is short it does not mean that much has not been done since June. It is hard getting such work properly started. It is much harder to have anything worth reporting before some time has elapsed. Another progress report will be furnished in about three months.

A. B. WILSON
*Chairman, Research Committee*

# Advanced Filtration

*By ROBERT J. GREEN,*
Filtration Division of Alsop Engineering Corp., Milldale, Conn.

## Earlier Methods

In this day and age, the problem of keeping plating solutions clean has, with the advent of the fast plating solutions, become of prime importance. Therefore, this paper is presented with the hope of throwing a little more light on the subject.

We are all familiar with the earlier method of filtrating, including the use of "felt" hats, woolen blankets, and other filter mediums of similar nature. I am sure a great many platers today can recall the tediousness involved during the operation of filtering by the process of decantation and the use of these antiquated filter mediums.

## Conventional Methods

It is a far cry from the use of hand methods to the use of mechanized units as we know them today. However, up until a comparatively recent time, the only adequate type of mechanical filters were huge affairs and therefore quite costly for the average plater. Of course, we have had the small portable type of filter for quite some time, but these units, with a few exceptions, employ a filter medium, cloth bags or canvas. Thus, it is a very difficult matter to obtain any kind of a clear filtrate without involving some type of outside aid. The reason for this is due primarily to the fact that the apertures in the cloth, canvas, etc., are so large that the smaller or minute particles of sediment, carbon, etc., will pass right through, so that in order to secure a real fine filtrate with this type of filter medium, it is absolutely necessary to cover these bags, canvas, cloth, etc., with a filter powder to prevent passage of small particles.

## Filter Aids

The use of the diatomaceous earth as a filter aid has been a boon to the plating industry. Its finer performance is due to the fact that not only will it pack itself on the filter, using cloth or bags, but it will also help to prevent slimy or colloidal solutions from coagulating and blocking the filter media. One of the largest manufacturers of this material furnishes it in different grades so that there is a proper grade for each purpose. One of the chief factors to be considered when using this material is how to make it keep its form on the filter cloth, canvas, etc. In other words, if in a type of filter press where the filter plates are mounted vertically, the slightest jar or accidental moving of the filter, or even a slight back pressure developed during filtration, it will invariably cause the filter aid to drop off. This leaves the open weave of the cloth or bag exposed to the passage of the unfiltered liquid. This may also result in fine particles of filter aid passing into the filtrate. The general method of procedure in this case, is to recirculate the liquid until it clears up. This point can be determined very readily by the condition of the plated work. If the work is rough, it is in all probability due to the fine particles of filter aids occluded in the deposit. When the roughness has entirely disappeared, then the process of recirculation has been completed. The use of finely divided asbestos is being tried out with varying successes. However, this material is very light in nature and it will positively need some sort of a binder to hold it in position. With the use of these various filtering mediums, it has been necessary, in order to secure adequate

filtration, to employ huge filters or filters employing a very great area, devoted to the formation of a filter cake and in many cases, a filter will be used that is entirely too large for the purpose of clarification.

### Modern Methods

In connection with the use of filter aids and in solving the problem of complete clarification by positively removing all traces of carbon and filter aids from the solutions, an entirely new type of filter is now available to the plating industry.

**ROBERT J. GREEN**

This remarkable machine is extremely small in size as compared with the conventional types, yet it will deliver equal volumes of liquid with any of its "granddaddies." The plates of this unit are mounted horizontally and the filter medium is composed of a fibrous material that is similar to the conventional packed filter in its ability to clarify any type of plating bath. Right there, the similarity ends because this material will not fall off when the filter is moved or when back pressure is created and in addition, it is claimed that these pre-made filter cakes can be obtained with any degree of density so that any desired degree of filtrate can be had. When using this type of pre-made filter disc or cake, it is possible with the new machine, to filter a great many of the various

plating baths heretofore thought impractical to filter. For this type of filtration it is simply a matter of changing the discs, washing the filter thoroughly and neutralizing it. Thus, it is possible to filter a modern bright nickel solution, followed by a copper cyanide solution or vice versa, and with positive assurance that the filter will not spoil any solution. The machine is so constructed that each part coming in contact with the liquid can be thoroughly and completely neutralized. In making this change, the manufacturers claim the total time required for neutralization and changing the discs is less than 15 minutes.

### Purification of Plating Solutions

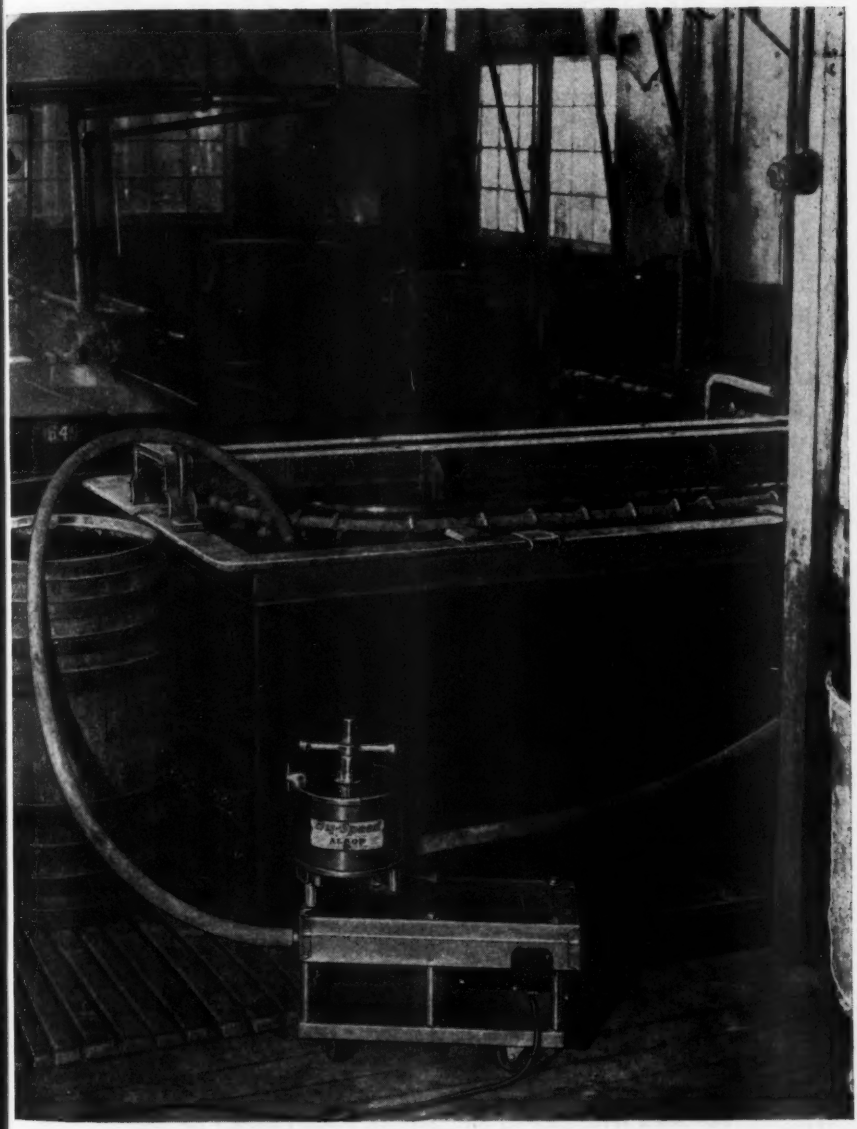
It is not intended in this paper to go into detail regarding the methods to use in the purification of plating solutions. This subject has been amply covered both in the A.E.S. REVIEW and the *Metal Industry*.

When it is necessary to use activated carbon or lime, or nickel carbonate, etc., with the new Sealed Disc Filter, it will be found that these machines have a wide cake ring with ample space to receive and hold a reasonable amount of sludge formation. The fact that these comparatively small machines are used so successfully with carbon, etc., is due primarily to the ingenuity of the designers and their foresight in providing a wide type of cake ring for specific use in the plating field. They have indeed acquired a tremendously wide experience in filtration problems during their twenty years and more in the manufacture of filters.

It is claimed that if the plating solutions that are to be purified are chemically treated and the resultant precipitate is allowed to settle, preferably over night, the treated liquid may be filtered with comparative ease by inserting the suction end of the hose directly below the top level of the solution and filtering from the top down. In this process, if the filter discs clog up excessively, this would denote the presence of slime or jell in the liquid being filtered, hence, it is absolutely necessary to break this slime or jell with some sort of a filter aid during the actual filtration. When it is necessary to use filter aids with this new Sealed Disc Filter, it is essential that the filter aid be mixed with clean water for the first coat because if one were to use unfiltered liquid with the filter aid, one would incorporate the slime or jell already existent in the liquid, directly into the pores of the filter disc, thus clogging the filter right at the start. If the filter aid is mixed with the clean water and placed on the discs properly, then during the actual filtration, one should add pre-dissolved filter aid directly over the suction end of the hose. This method will feed the filter aid along with the slimy liquid and thus help to break it up. In the case of ordinary carbon treatments, it has been found that it is not necessary to use outside filter aids. In this respect, one simply uses a disc of a more definite density other than that which is employed in the regular daily filtration practice. When filtration is carried out in the above manner, the sludge may be removed from the bottom of the tank and placed in a separate receptacle and allowed to settle. Any liquid then remaining can be reclaimed either by siphoning or filtration.

### Pre-Made Filter Cake

A word about the pre-made filter cake will be of interest to the plater. When using this type of filter disc, it is not necessary during daily filtration to use any filter aid whatsoever. These discs are so constructed that they actually take the place of the packed filter cake used with the conventional types of filters. This is possible because of the various densities of these discs. They will remove the finest minute particles of carbon with ease so that for average operation, it is a simple matter to change the discs, avoiding all the mess of scraping off filter aids, etc.



**Alsop Engineering Company's Filter**

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**AMERICAN ELECTROPLATERS' SOCIETY**

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**JUNE 9-10-11-12, 1941**

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***For Men Who Live to Eat, Boston Food Cannot be Beat***

# Some Kinks *in the* Preparation *of* Metal *for* Bright Nickel Plating

*By ROBERT SIZELOVE*
Frederick Gumm Chemical Company, Kearny, N. Y.

Read at Boston Branch Annual Meeting, April 13, 1940

ABOUT the year 1930 when Chromium Plating became popular, it was found necessary to change the composition of metal cleaning compounds primarily to obtain better adhesion of the chromium electrodeposits.

When the use of proprietary Bright Nickel Plating solutions started to become popular about the beginning of 1937, it was necessary for the cleaning industry to again modify its compounds for use prior to bright nickel plating. This time it was necessary to change them for two reasons: (1) to effect greater adhesion, and (2) so that bright nickel deposits could be formed on smut covered base metals.

In the following paper, we are going to cover the general changes which have taken place not only in cleaning compounds, but also in cleaning cycles, so that bright nickel deposits could be obtained which would be both *highly adherent* and *highly brilliant*.

## PREPARATION OF BUFFED COPPER PRIOR TO BRIGHT NICKEL PLATING

1. Effect of cleaning on brilliance and adhesion of nickel deposits.

In order to reproduce or to enhance the luster of buffed copper, we have found the use of electric cleaners to be essential. The use of soap-type soaking cleaners is outmoded. Even when fairly soft water is used in a cleaning tank there is formed on the work insoluble calcium and magnesium salts of the fatty emulsifiers used in making soaking cleaners. These salt films cling tenaciously to the work and neither acid or cyanide will remove them. After the work is bright nickel plated, these films will show as a grey cast underneath the bright nickel plate. Also, a soaking cleaner will not remove smuts and inert matter from the base metal. When these are not removed they also produce grey casts and blotches under the bright nickel. The use of an electric cleaner of

high conductivity and good wetting power eliminates the above difficulties. A properly designed electrocleaner can be used with either direct or reverse current on copper. The choice of which to use or perhaps a combination of both depends on several factors. In theory there is twice as much gassing at the work when using direct current than when using reverse current, and therefore, we would assume that a specific piece of work would be cleaned twice as fast with direct current as with reverse current. This assumption we have seen proven a great number of times when we have cleaned practically identical test pieces with direct and reverse current. The use of reverse current has one advantage in that none of the foreign matter removed from the work can be redeposited on subsequent work being cleaned. This obvious failing of a direct current cleaning bath can be easily overcome, however, by the use of a cleaner which is properly inhibited to prevent this redeposition. This type of cleaner will prevent the redeposition of carbon, metallic carbides, or iron hydrate, which all tend to form a spongy and splotchy deposit in an alkaline solution. As a result of observing many cleaning installations, we find that a cleaning cycle of direct current (cathodic) followed by reverse current (anodic) gives the best results. The direct current operation removes oil, greases, insoluble matter and smut. The reverse current operation removes any hydrophobic films left on the metal, and also provides a microscopic etch which insures good adhesion of any subsequent electroplate.

2. Effect of acid dipping after cleaning on brilliance and adhesion of nickel.

After the buffied copper has been electrocleaned, it can be finally prepared for the nickel plating operation by either of three methods: (1) use of a dilute cyanide dip followed by a mild sulphuric acid solution — the cyanide is used to cut any tarnish from the cleaning and the acid is used to neutralize the cyanide, (2) the use of a cyanide dip followed by a weak muriatic acid dip, (3) the use of a fairly strong muriatic dip to remove both the slight tarnish and the alkali film on the work. We have found method 1 to give the best results in the long run in regard to both getting good adhesion and the proper brilliance. Methods 2 and 3 also have the disadvantage that the chloride content of the nickel bath may build up from drag in.

## PREPARATION OF BUFFED BRASS OR BRONZE FOR BRIGHT NICKEL PLATING

1. Effect of cleaning on the brilliance and adhesion of the Bright Nickel plates.

The remarks made on the cleaning of copper also apply here. We find that best adherent and most brilliant nickel deposits are obtained by using direct current for 15 to 45 seconds, and then reverse current for approximately the same length of time.

ROBERT SIZELOVE

2. Effect of copper striking.

On soldered brass or bronze it is essential to copper strike to get adhesion. On unsoldered work, the copper strike is only a safety factor if the cleaning is not up to par. When a copper strike

is used, it is advisable to cyanide dip the work before copper striking.

The use of a copper strike will not affect the brilliance of the bright nickel unless the copper solution is low in cyanide or too high in metal.

3. Effect of acid dipping.

Good adhesion and brilliance can be obtained with either dilute sulphuric or dilute muriatic acid. However, sulphuric acid is usually recommended so that the chloride content of the nickel bath is not built up by drag in.

**PREPARATION OF BUFFED OR SATIN FINISHED ZINC-BASE DIE-CASTINGS FOR BRIGHT NICKEL**

1. Effect of cleaning on brilliance of nickel deposit.

The cleaning operation has practically no effect on the brilliance of the bright nickel due to the fact that an intermediate copper plating operation prevents any surface film on the die-casting from being visible after the nickel plating operation.

2. Effect of cleaning on the adhesion of the Bright Nickel deposit.

The method of cleaning greatly affects the adhesion of the electrodeposit. If direct current cleaning alone is used, very good buffing compound removal can be obtained, but the adhesion of deposits is never certain, which is probably due to hydrogen absorption during the direct operation. If reverse current cleaning alone is used with the proper cleaning compound, the adhesion of the subsequent electroplates will be good. However, the reverse operation does not remove buffing compounds very well at all, and if the buffing compounds are not thoroughly removed they will gradually contaminate the cleaning cycle and eventually drag into the bright nickel solution causing peeling of the nickel. We obtain excellent results in regard to buffing compound removal and adhesion of deposits by using a cleaning cycle of direct current for 15 seconds to 1 minute followed by a reverse operation of from 15 seconds to 1 minute. Die-castings cleaned in the cycle can be plated and baked at 400° F. for 10-20 hours without the deposit blistering.

3. Effect of acid etching on adhesion and brilliance of nickel deposit.

In order to get satisfactory adherence of the nickel, it is necessary, just as in dull nickel plating, to acid etch the die-casting for 3 to 10 seconds. A 3 percent by volume solution of muriatic, sulphuric or acetic acid may be used. We have found muriatic acid to give the most consistent results in regard to obtaining good adhesion. The acid etching operation dulls the die-casting slightly but this does not materially affect the luster of the resultant bright nickel if the copper solution is properly controlled.

4. Effect of copper plating on adhesion of the Bright Nickel.

To get consistently good adhesion of bright nickel deposits we have found it necessary to put about .0003 (3 ten-thousandths) of copper on. This corresponds to about a ten minute plate at twenty amps. per sq.ft. in a Rochelle salt solution.

5. Effect of copper plating on brightness of nickel deposit.

When using a copper plating operation of ten minutes at about twenty amps. per sq.ft., the copper deposit is a smutty red which, if bright nickel plated without buffing the copper, leaves a decided dull haze underneath the nickel. However, if the copper plating operation is carefully controlled, it is possible to produce a semi-bright copper deposit which when bright nickeled without copper buffing shows no haze under the nickel plate. This bright nickel can be directly chrome plated without losing any luster. The use of the semi-bright copper operation has two advantages of saving a copper coloring operation, the saving of a racking and unracking operation, and eliminating the possibility of dragging buffing compounds into the bright nickel solution after copper coloring. The copper solution used to produce a semi-bright plate is as follows:

| | |
|---|---|
| Metallic copper content | 3 to 3½ oz. per gal. |
| Free cyanide | .7-1.0 oz. per gal. |
| Rochelle Salts | 4 to 6 ozs. per gal. |
| Carbonates | 4 to 6 ozs. per gal. |
| pH | 11.5-12.0 with pH. paper |
| Hypo | 1/32 oz. per gal. |
| Temperature | 130 to 140 deg. F. |

Agitation — using a horizontal rod agitator with about a 6 inch stroke and which reverses motion about 50 to 60 times a minute or approximately once every second.

The hypo is the actual brightening agent but the brightness could not be produced without controlling the other solution

ingredients and without using agitation. After the initial 3 oz. of hypo per 100 gal. is added, it is necessary to add about 1 oz. per 100 gal. for every 20 hours of operation.

6. Acid dipping of the copper.

The copper deposit should be dipped in weak sulphuric acid before bright nickel plating.

**PREPARATION OF POLISHED, BUFFED, AND SATIN FINISHED STEEL AND PLAIN UNFINISHED STEEL STAMPINGS FOR BRIGHT NICKEL**

1. Effect of cleaning.

In the cleaning of steel, both finished and unfinished, the use of a soaking cleaner is very unsatisfactory even when followed by an electric cleaner. A soaking cleaner will remove the saponifiable and emulsifiable oils and fats on the steel and will leave the insoluble smut behind. This smut which is left is much more difficult to remove with an electric cleaner than is a combination of smut and oils. If the steel covered with smut and oils and fats is electrocleaned, the electrocleaner acts on the oils and fats and in so doing carries off the smut.

In fact when steel is encountered which is heavily smut covered and is not oily, it is easier to remove the smut by first dipping the steel in a low viscosity soluble oil.

It is important that all smut be removed from the steel if a brilliant bright nickel deposit is to be obtained. This is true either if the bright nickel is to be deposited directly on the steel or with an intermediate copper striking (up to 5 minutes) operation. If a copper plate of over 5 minutes is used, any smut on the steel will be covered so that it will not affect the appearance of the Bright Nickel. However, the smut will cause poor adhesion of the copper deposit. Therefore, to get good adhesion and perfect brilliance of the Bright Nickel deposit it is essential to remove all smut from the steel if the steel is direct nickel plated, or intermediately copper striked, or intermediately copper plated.

We have found that these smuts can best be removed with a combination of direct current cleaning followed by reverse current cleaning. The direct current operation removes the bulk of the smut. The reverse current removes any hydrophobic films on the steel and provides a microscopic etch which insures good adhesion of subsequent electroplates.

Offhand, it would appear that the use of two cleaning baths would be more expensive than just using one. However, we have observed from a large number of installations that the unit cleaning cost over a definite period of time is less when two cleaners, one direct and one reverse, are used. In connection with this we would like to quote from an article by Mr. F. A. Maurer in the May issue of the MONTHLY REVIEW as follows: "A considerable degree of success was attained using the single cleaner, but we are now better satisfied with the double cleaner as it is now. With the single cleaner, weekly dumping of the solution, daily suctioning to remove sludge off bottom and very close attention to foam removal, and prevention of foam carry-over to succeeding tanks was necessary. We still have to watch the foam removal, but there is much less now in the second tank. *Total use of cleaner in the two tanks is less than it was in the single tank.*"

2. Effect of acid dipping.

We have found the use of hydrochloric acid of at least 50 percent by volume gives best adhesion and brilliance of the Bright Nickel deposit.

3. Effect of copper deposit on adhesion of nickel deposit.

We have found that the use of a copper strike or a copper plate gives no better adhesion than if the steel is directly bright nickel plated. However, in some cases it is essential to copper plate in order to meet plating specifications for corrosion resistance.

4. Effect of copper plating on brilliance of nickel deposit.

The use of a copper striking operation of from 1 second to 30 seconds at 6 volts does not affect the brilliance of the subsequent bright nickel. Copper deposits of greater length in time than 30 seconds do materially dull the bright nickel deposit. However, if the bright nickel solution is the type which increases in brightness with thickness, the dulling effect of the copper deposit is counteracted if a nickel thickness of at least .0005" (one-half thousandth) is used. Incidentally if the cleaning cycle has not completely removed all smut, this will be very clearly exposed by a copper striking operation.

5. Effect of acid dipping copper deposit.

If a copper striking or copper plating operation is used, the copper deposit should be acid dipped in weak sulphuric acid before bright nickel plating.

**PREPARATION OF CAST IRON FOR BRIGHT NICKEL PLATING**

In the preparation of cast iron, all of the remarks made under the preparation of steel apply, except the strength of the acid pickle. A 50 percent muriatic acid would pit and etch the cast iron. With cast iron, an acid pickle strength of 3-5 percent should be used.

**PREPARATION OF SPRING STEEL FOR BRIGHT NICKEL PLATING**

In regard to the preparation of spring steel, such as bumper steel, all of the remarks made on the preparation of plain steel apply except the coppering operation. We have found that the use of a copper strike gives less adhesion than if the spring steel is directly bright nickel plated. The use of a 3 to 5 minute copper plating operation gives better adhesion than if the steel is directly nickel plated. In other words, the use of a copper strike is definitely harmful as far as adhesion is concerned. The use of a 3 to 5 minute plate in a Rochelle salt copper solution at twenty amps. per sq.ft. prior to the bright nickel gives excellent adhesion of the nickel. If hypo is used in the copper solution, the bright nickel can be chrome plated direct or the nickel can be fanned off to get an extra high luster.

**PREPARATION OF CYANIDE HARDENED STEEL FOR BRIGHT NICKEL**

In regard to the preparation of cyanide hardened steel for bright nickel plating, the remarks made on cleaning of regular steel apply here also. In regard to the adhesion of bright nickel on cyanide hardened steel, we have found that a nickel striking operation in a solution of nickel chloride and hydrochloric acid is superior to a copper plating operation. In some instances where the nickel strike does not give the desired adhesion, the use of a reverse 22 degree Be. sulphuric acid etch prior to the nickel strike will give perfect adhesion.

**PREPARATION OF ALUMINUM FOR BRIGHT NICKEL PLATING**

In regard to the cleaning of aluminum, good adhesion of the nickel is obtained using a cleaner which gives a slight etch. A heavy etch is unnecessary for good adhesion and will dull the aluminum so that the resultant bright nickel will be grey.

After the cleaning operation, the aluminum is treated with the Traver's process and then can be bright nickel plated direct. If it is desired to chrome plate the aluminum and get a high finish, it is advisable to fan off the nickel before chrome plating.

# Metallic Losses *in* Gold Plating

*By PAUL A. OLDAM*
Head of Finishing Dept.
Shiman Manufacturing Co., Newark, N. J.
Presented before the Newark Branch.
A. E. S. March 15, 1940

DUE to the force of production, the electroplater overlooks many important items or incidents that occur during the course of gold plating which lead to many startling discoveries as to just where the gold as metal goes. The cost of gold alone in gold plating warrants investigation as to careful plating along with other anticipated manipulations that are sometimes necessary to produce a gold finish.

Most all jewelry firms have a method for recovering metallic gold from sink accumulated waste, but no emphasis is placed on the loss of drops in gold solution form in the carry over from plating solution to the rinse water sink. Some manufacturers of jewelry have limited space. Their gold plating outfits are cramped into one small area, neglecting the space necessary for reclaim rinse crocks in the layout for gold plating that would tend to reduce the cost of dragout.

It is important that facilities should be adequate in the layout of the plating department. Consideration should be given to unnecessary footsteps, avoiding zig zag carry over of the work to eliminate the loss in dragout as much as possible. To minimize the dragout, sufficient convenient space should be allotted for at least one reclaim rinse tank, for this tank is as important as the gold plating unit.

For the finding of some of these little episodes where gold would be lost, it is assumed that the average gold solution is maintained at 5 dwt. per gallon. Multiplying the cost of one pennyweight, $1.75, by 5, the answer represents the cost of one gallon of solution, or $8.75.

Drops are a small volume but when accumulated in large numbers they involve a great loss, e. g.,

There are 3.785 c.c. in one gallon
and x 20 (approx.) drops in one c. c.
therefore 75,700 drops represent one gallon

Should 75,700 pieces of work of the smallest dimension be plated, surely the carry over would be one drop on each piece, as dragout, or loss if properly arranged reclaim rinse tanks are not available. A loss of $8.75 could be accounted. This however does not apply to basket plating of small articles.

From a practical experiment that was conducted in a plant doing productive gold plating, it was found that one reclaim rinse tank does not reclaim all of the dragout, no matter how carefully the operation of gold plating may be carried out. For all precautionary factors were studied and adhered to, such as motion of time in leaving solution after plating, draining, auxiliary means to assist drainage, and other necessary aspects to minimize dragout. In this particular experiment, three rinse tanks were very conveniently placed adjacent to the gold plating solution.

The following is the arrangement of rinse tanks and gold plating solution concerning the experiment:

| GOLD PLATING SOLUTION | RECLAIM RINSE # 1 | RECLAIM RINSE # 2 | RECLAIM RINSE # 3 |
|---|---|---|---|

The metallic gold found as a result of analysis over a period of three weeks in the three rinse reclaim tanks is as follows:

Reclaim rinse tank # 1—2.84 dwt./gal.
Reclaim rinse tank # 2—1.26 dwt./gal.
Reclaim rinse tank # 3—0.34 dwt./gal.

The 15 gallons of plating solution were maintained at 5 dwt./gal. throughout the entire experiment. The gold plating solution was replenished to the corrected volume from reclaim rinse number 1, tank 1 was replenished from reclaim rinse number 2, number 2 was replenished from rinse number 3. The only reclaim rinse where fresh water was added was reclaim rinse tank number 3. Each rinse tank contained 15 gallons. Therefore, to assume the loss in dragout, multiply the metallic content of each rinse tank by 15, then by $1.75. The answer would be the loss if no reclaim rinse tanks were in the sequence of gold plating.

The report of results shows that one reclaim tank is insufficient but that two or more are necessary. Much more metal would be lost if the metal concentration of the gold plating is higher then five pennyweight per gallon.

The question of the time necessary for the additional rinsing is a problem if the gold salvaged does not pay for the time involved for rinsing. The type of work and the method used in plating should also be considered.

During the course of operating a gold solution, there are certain mechanical items and physical procedures used in conjunction with the solution so that it will function properly. Some of these gadgets and operations are trivial concerning dragout and are called petty thieves, yet, if used excessively and carelessly, become major issues. Of these, the scoop, thermometer, cathode and anode rods, saucepan, stirring rod and many other items too numerous to mention are neglected in connection with gold losses. Gold is very electro-positive and will precipitate itself out on electro-negative metals. Much gold can be lost in this manner.

A scoop is at all times necessary for the reason that should an article fall to the bottom of the solution it acts as a means to recover the fallen article. Scoops are usually made of brass and have a tendency to precipitate gold from solution. A better metal for the making of a scoop would be stainless steel. This would not precipitate gold but carry dragout only.

Saucepan—It is not understood why, but there are a great number of gold platers who still have the old method of boiling the gold in its various compounds with cyanide to replenish their solutions. This so called boiling is administered in a beaker, but more often in a saucepan. There is the possibility of the contents boiling over causing a much greater loss than would be expected, for the volume is small and the concentration very high. Also, metallic gold may be precipitated in the cracks of the enamel saucepan if high gas flames are applied. Bottles, or other receptacles containing the gold compounds should receive thorough rinsing.

Stirring rods are essential, especially when additions of some kind are made to the solution. These should be of glass, they too

become wet and are termed a source of dragout. Thermometers—Each solution should have a thermometer. They also carry out solution as dragout, however small.

Cathode and anode rods, in cleaning for contact, should not be cleaned with emery cloth over the solution. The fine particles of copper or brass dust can be a possible cause to throw the solution off color or precipitate gold if the solution contains low free cyanide.

The solution should be kept clean and free from foreign matter by means of filtering, skimming, washing the gold plating tank. All the necessary material used for cleaning, such as the filter paper or filter bags, tissue paper from skimming, brushes, sponges, and cloth should be salvaged and when convenient, the gold recovered, for the absorption in these probably contains much gold.

Anodes — The insoluble type can be left in solution or taken out at the end of the working day, a choice to be made by the plater. Fine gold anodes should be taken out of solution whenever the solution is not in use. The free cyanide attacks the fine gold making it difficult to control or record the weight of the anode correctly as to actual gold dissolved for plated work. In a recent test to determine just how much gold is dissolved in solution by the free cyanide, a small fine gold anode was weighed and placed in a solution having 0.5 ounces of free cyanide. A loss or decrease of 0.484 milligrams in weight was shown after 20 hours. The dragout on the anodes can be estimated depending on the size of the anodes and the number of times they are taken out of solution.

Work baskets for plating of small articles should be used only for gold plating and not for general plating. Baskets acquire gold deposits that are spongy when coated heavily, in turn, the small particles of gold fall to the bottom of solution and cause precipitation. Whenever a basket receives an objectionable coating of gold, it should be discarded from use and salvaged, or the gold stripped off and placed in use again.

Since the advent of racks, wire has been displaced and used only where necessary. Racks are preferable over the use of wire,

for the gold deposited is localized and can be recovered, where the wire would be discarded. Racks are an important item, and should be given much thought particularly as to design. The cross members and the upright supports, hooks, springs and clips should be arranged and designed in such a manner that no pockets of great size are formed to hold solution when the racks are immersed in solution.

All plating racks should be coated over with a fairly heavy nickel deposit prior to use. The nickel deposit protects solder joints and makes small wire hooks and pins more substantial, thus avoiding breakage of small pieces that would in turn fall to the bottom of the solution. After fabrication and nickel plating of such racks, they should be coated over with some good stop off or resist material to cyanide solutions, to prevent gold from depositing on the rack. Racks should not become coated over with gold excessively. Heavy deposits flake off and drop to the bottom of the tank. Occasionally during plating small hooks, pins and clips break off and cause gold to precipitate out from solution.

One method of reducing the gold deposited on racks is to scrape off the excess and treat it in a solution of cyanide with reverse current. The nickel on the rack in this instance does not allow the solder joints to become loose, for nickel is not affected as much in cyanide solutions.

The time allowed for draining the work over the solution after work has been plated is also of importance. The work should be given sufficient time to drain (not just a few seconds, but longer) and tilted to allow a flow of solution to come to one point of the rack and the work, with the rack, should be shaken over the solution prior to rinsing in the reclaim tank. If the work has pockets or deep recesses, some auxiliary means such as a glass rod should be held against the work in a tilted position to aid in the draining.

Small work that is plated in bulk, a work that has been milled or machined on a lathe, has at times, depending on the quality of machining, burrs or chips. These chips or burrs may break off and fall, while agitating during plating, through the basket perforations into the solution and cause precipitation.

Carbonates in solution can be termed as a source of gold waste,

since carbonates are formed by decomposition of cyanide with the aid of the evolution of oxygen at the anode. These carbonates yield a deposit that is red and unwanted. The plater always seeks a natural gold color. To obtain the natural gold color from a solution that has objectionable carbonate content, at the end of the plating time the plater begins to tap or strike the work with the rack on the cathode rod. This would show that the gold deposited during the course of tapping or striking is not accounted for, or that it is difficult to calculate the cost of gold deposited in that manner.

Metallic losses in the operation of gold plating are very numerous and occur when the solution is in use, when being maintained to its governing factors, or when it is at a standstill. Such occurrences can be termed as losses and can be laid to (1) improper arrangement of solution and reclaim rinses, (2) inadequate equipment, (3) neglected instructions to the operator. However, without contradiction, it should be stated that no matter how intelligently the operation is supervised, there will always be some unaccounted losses either in solution form or as solid metal.

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## THE KEY TO THE CONSTITUTION OF THE UNITED STATES

Mr. J. F. Roche, president J. Binks Mfg. Co., Chicago, has very kindly presented us with a 65 page book with the above title. We recommend the book because of its value in making a person thoroughly familiar with the Constitution of the United States by means of Question and Answer. It embraces in this connection the duties of the President, Supreme Court, Senators and Representatives and clearly defines the Judicial Legislature and executive systems of our government.

The publishers are National Institute of Public Education, 407 South Dearborn St., Chicago, Ill. Price 25c each. Bound copies 50c each.

## NEW BOOKS

**Salts of the Platinum Metals and Gold.** Published by Baker & Co., Inc., 113 Astor Street, Newark, N. J. Size 11″ x 8½″; 10 pages. Given free upon inquiry under company letterhead.

This booklet is a ready source of information on the salts of platinum, rhodium, ruthenium, iridium, asmium and gold, which information is difficult to secure in the literature. In discussing the salts of each metal, the chemical formula, molecular weight, theoretical metal percentage, color and form and solubility of the salts are given. In addition, discussions are presented on the chemical properties and uses of the metal and its salts.

A table of international atomic weights is given as well as a comparison of weight measures.

Mention is made of the company's other booklets entitled: "Platinum Metals and the Chemical Industry," "Bibliography of Patents on Palladium as a Catalyst," and "Data Concerning Platinum."

## NEW METHOD DEVELOPED FOR TINNING BRASS GAUZE

Reprinted from *Steel*, Sept. 16, 1940

Tinning brass gauze by the hot-dip method often causes the interstices of the gauze to become filled with tin. In addition, tin in the pot becomes sluggish and drosses badly.

According to the publication of International Tin Research and Development council, "Tin and Its Uses," contamination of the molten tin is quite commonly experienced when tinning brass by hot-dipping. Furthermore, the troubles arising from it would be accentuated when dealing with fine gauze owing to the large surface area of this material. Copper and zinc dissolved from the brass make the tin sluggish and difficult to drain from the interstices of the gauze, and the zinc causes surface oxidation of the tin bath. This oxide dross is liable to adhere to the surface of the tinned gauze and to spoil its appearance. It is difficult to avoid trouble from these causes in the case of fine gauze, although contamination of the bath can be delayed by employing the minimum temperature which permits adequate draining of surplus tin, and a short time of dipping.

There is, however, an alternative method which has none of the disadvantages of hot-dipping for this purpose. Tests have shown that very fine brass gauze can be successfully tinned by electro-deposition in the alkaline sodium stannate bath. A coating of 0.0005-inch is deposited, and, after plating, the gauze is heated to a temperature a little above the melting point of tin so as to fuse the coating. This causes the wires to solder together at the points of contact, but the interstices of the gauze remain free from tin. Fusion should be carried out as rapidly as possible to avoid undue alloying of the tin with the gauze. It may be effected by the careful use of a gas-flame if the work is not too large. A definite change in the appearance of the coating takes place during fusion, and this is quite easily detected. A tin coating closely resembling a hot-dipped coating is obtained by this method.

## NEW HAVEN BRANCH PLANS SEASON'S ACTIVITIES

Under date of August 21, Mr. Clarence Garner, Secretary of New Haven Branch writes:

Last night we had a meeting of the officers, the executive board and committees of New Haven Branch, at Wilcox Pier Restaurant at Savin Rock. We all enjoyed a shore dinner at 6:30 P. M. after which we discussed plans for the coming season. Mr. Joseph Sullivan, as vice-president, was appointed chairman of the membership committee. He is to appoint his own committee. Mr. Ellsworth Candee, first vice-president, will be notified according to his request.

New Haven Branch voted to hold its usual educational class this year and the subject will be, "A Practical Course in Electroplating." Mr. Thomas H. Chamberlain, our president, outlined a tentative program for the course covering all phases of electroplating in everyday practice from the finishing of the base metals preparatory to plating, through the cleaning and plating cycles and then through the different finishes after plating. Mr. Robert S. Gray, our librarian, will handle the educational work. We have had courses in Solution Analyses, Industrial Chemistry and last year in Metallurgy. The course this year will be based on everyday practice and will be simplified so that the average layman can readily interpret all phases of the course. It will be open to both members and non-members and notices will be sent to all industries in our section giving them an outline of the course. We feel that we should have a large class this year. Meetings will be held as usual at the Sterling Chemistry Laboratory of Yale University in New Haven where laboratories and class rooms are available to our branch. We feel very fortunate in having such a place for our use.

A similar meeting of the officers, executive board and committees is called for Tuesday, September 10, prior to our first regular meeting of the branch.

This meeting will be preceded by a dinner at one of the New Haven hotels. Final plans will be completed and a full report for the entire fall and winter program will be made ready to place before our members at the first regular business meeting.

I will endeavor to give you as much branch news as possible during the year so we may get proper representation in the REVIEW so I am sending this along as a starter for your use.

CLARENCE GARNER, *Secy.-Treas.*

## W. LASH MILLER, SCIENTIST, DIES

Was head of U. of T. Chemistry Department
On staff 48 years

Outstanding Canadian scientist, Prof. William Lash Miller, C.B.E., head of the department of Chemistry, University of Toronto, from 1921 to 1937, died Sunday afternoon, September 1, in the Toronto General Hospital. He would have celebrated his seventy-fourth birthday on Sept. 10. He had been retired for two years.

Professor Miller, for forty-eight years a member of the staff of the University of Toronto, was an international authority on chemical thermodynamics. As such, he was chosen as one of the seven leading physical chemists in the world to deliver an address at the opening of the Sterling Laboratory, Yale University. He also made distinguished contributions to chemical kinetics and to electrochemistry. In 1935 he was made a commander of the Order of the British Empire.

Professor Miller was born at Galt. He graduated in Arts from the University of Toronto in 1887, taking post-graduate study at the University of Berlin, Gottingen, and obtaining the degree of Doctor of Philosophy from Munich and Leipzig in 1892. He joined the staff of the University of Toronto the same year as demonstrator. In 1900 he was appointed associate professor of physical chemistry, and in 1908 professor of chemistry. In 1921 he was made head of the department, retiring as professor emeritus in 1937.

An outstanding teacher, he won recognition in the United States as well as in Canada.

He was the author of numerous papers reporting his researches in prominent scientific journals, and from 1910 to 1926 was associate editor of the Journal of Physical Chemistry.

Professor Miller held many honors in the field of science. He was chairman of the Chemistry Section, American Association for the advancement of Science, from 1913 to 1923; an honorary member of the American Chemical Society; past associate editor of the Journal of the American Society. One of the founders of the Canadian section of the Society of Chemical Industry, he served as chairman in 1910. He was elected honorary member and president of the Electrochemical Society in 1912 and was a member of the Washington Academy of Science and of the Franklin Institute; a past vice-president of the British Association for the Advancement of Science; a past president of the Canadian Institute of Chemistry, and a Fellow of the Royal Society of Canada, of which he was president in 1935.

Surviving are his widow, Pauline Miller; two daughters, Adelaide and Frederica, both of Toronto, and one son, W. R. Miller, of Ottawa.

Writing to us of Dr. Miller's death, Mr. Walter S. Barrows, Past Supreme President of the A.E.S. makes the following comments:

The world of Chemistry has lost a grand personality, the A.E.S. has lost a friend and one of their honorary members.

Professor Miller was one of my dearest friends, whose helpfulness was always the best. He did wonderful work for Toronto Branch, during our first few years and has always been anxious to help the A.E.S.

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Business and Social News

# BRANCH NEWS

Educational Activities



**Newark Branch** held its regular meeting on Friday evening, August 16, at the Club Room of the Hotel Douglas, Newark, N. J.

The following applications were voted to take the regular course: Mr. John W. Dobson, Cowles Detergent Co. to Associate Membership; Michael Tato, Four Plating Co., to Associate Membership; Joseph A. Fusco, Four Plating Co., to Active Membership; Anthony J. Fusco, Four Plating Co., to Associate Membership; John J. D'Elia, Four Plating Co., to Associate Membership.

The Secretary gave a report on what happened at the Annual Fishing Trip. He stated that 28 members attended and that over 400 fish were caught, mostly Bonitas and that there was lots of fun and entertainment on the night before.

Mr. Louis Donroe and Mr. Paul Oldam next outlined the schedule for our 1940-1941 Educational program. Mr. Donroe named 15 prominent speakers whom he was contacting to act as guest speakers at our meetings.

GEORGE WAGNER, *Secy.*

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**New York Branch** held its summer monthly meeting on Friday, August 23, at their headquarters in the Conference Rooms of the Hotel Pennsylvania, New York City.

This was a regular business meeting enhanced by the presence of the Supreme President, Mr. Frederick Fulforth of Roslyn, Pa., and the National Secretary and Editor, Mr. W. J. R. Kennedy of Springfield, Mass. Both officers addressed the membership on matters relative to the Supreme Society administration and seeking cooperation from the various branches in the main features of the Society's activities. Both officers' remarks were well taken and their suggestions were considered and discussed and met with general approval. Mr. Fulforth and Mr. Kennedy were extended a vote of thanks and pleasure for their visit to New York.

A letter from the Supreme 1st Vice-President, Mr. Ellsworth T. Candee of Waterbury, Conn., relative to the National Membership Drive was read and a Branch Chairman on membership was appointed to take charge of this work on Mr. Candee's suggestion.

After the business meeting, the members and a number of out-of-town visitors spent a social hour with refreshments and good fellowship much in evidence.

There were two applications for membership filed at this time. The meeting was adjourned at 11.00 P. M.

F. J. MACSTOKER, *Secy.*

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**Milwaukee Branch** opened the new season of regular meetings on Friday September 6 with a bang-up attendance, in spite of the quite humid weather. As some one once remarked, it isn't the heat, it's the humidity. And that's not an error.

Milwaukee Branch seems to be doing all right by itself in regard to new members. Every meeting brings forth at least one new application, and we are not taking them in the front and kicking them out the rear door either.

We are again sponsoring a class in plating chemistry this year. Phil Ritzenthaler, who taught the class last

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year, says that if enough members enroll at the Vocational School (at least 20) another class will be run this year. So if you are interested, be sure to register as soon as possible.

No doubt all members of the Society in this vicinity will be interested in knowing that we will again have our annual Educational Session and Banquet on or about the first Saturday in April, 1941. More details on this later as they develop.

We had a speaker lined up for the evening, but at the last moment circumstances beyond control required a change in the plans, so after the business session Librarian Henry Bornitzke conducted a Question Box. If one may be permitted to judge by the number of questions asked, our members seem to be reluctant about admitting there are things they don't know. This is the wrong attitude. We are an educational society, and the purpose of a question box is to help everyone and better our work. There are plenty of questions to be asked and answered, because after the meetings we break up into small groups and hash them out. If this were done in open meeting we would all benefit and those who suffer from paralysis of the vocal cords in front of a group would soon conquer their deficiency.

DEXTER F. RHODES, *Secy.*

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**Buffalo Branch** held the first meeting of the season at Canisius College, Friday Sept. 13, with President Joe Ruff in the chair.

Mr. R. Fischer was appointed as chairman for the annual picnic.

Dr. C. J. Wernlund gave a brief account of the 1940 Convention. To complete the evening he then gave a talk on Metal Cleaning before Plating.

There were three great drawbacks to successful plating: gases, liquids and solids adhering to the work to be plated. Gas could be generated by scale on the work resulting in blistering. Pickling or sand-blasting would remove the scale. Liquids could be removed easily by an alkaline cleaner. These presented no great difficulty.

By far the greatest problem was the cleaning of parts to which solids adhered. These were usually metal oxides, metal particles and buffing compounds. Oxides could be cleaned off by using a weak solution of Hydrofluoric or Sulphuric used anodically or cathodically. Metal particles were often magnetized to the metal itself or held on by grease or oil. This was best overcome by use of an alkaline cleaner or pickling. If smut was left on the work it could be removed by a warm anodic cyanide solution and also by mechanical means such as high pressure sprays. Trichlor-

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Dr. Wernlund was given a hearty vote of thanks at the conclusion of his talk and the meeting adjourned at 10 p. m.

RODERICK MCGHEE, *Secy.*

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**Anderson Branch** held its first dinner meeting following the regular summer adjournment on September 10 at the Y. M. C. A.

The chapter was particularly honored by having as its guest Mr. W. J. R. Kennedy, Executive Secretary of the Supreme Society. Mr. Kennedy spoke briefly of the activities in other branches, and especially emphasized the desirability of everyone's marking the next convention date on his calendar. The branch highly approved the system of pre-printing the various papers that were presented at the Dayton convention, and offered, as a further possible advantage, the idea of mailing the preprints to the various branches about a week or two in advance of their being presented. This would be quite advantageous to those members of the society living close to the place where the convention was being held, and who could not attend all the time. By having the opportunity to read the papers in advance, they could select the sessions they wished to attend and contribute more enthusiastically to better discussion periods.

Mr. R. M. Wagner, as the drafted representative of the late convention delegates, gave a rapid resume of the convention proceedings.

The speaker of the evening was Mr. P. A. Martinson, of the Johns-Manville Corporation, who presented a talking movie on *Celite*. This film was very interesting and aptly illustrated the many uses of diatomaceous earth products. The picture traced the processing of diatomaceous earth from the strip mining of the crude product to the ultimate fabricating of insulating material, filter aids, plastic fillers, etc.

Following the main program, and after the presentation of petitions for membership of Mr. W. W. Cothran and Mr. W. R. Laux, Mr. Kennedy led a discussion to determine the possibilities of the formation of an Indianapolis Branch.

At 9:30 P. M. the meeting, as a whole, was adjourned in favor of various committee meetings.

REX W. OYLER, *Secy.-Treas.*

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**Toronto Branch** held its first fall meeting September 6 at the King Edward Hotel.

Jack McLean read the report of the annual audit and was well received. John Acheson spoke about an educational session to be held somewhere near Niagara Falls, Ont., and promised to get in touch with Dr. Wernlund of the Buffalo Branch. Bill Price brought up the matter of the branch chemistry class and Jack Walker outlined his new membership campaign.

John Acheson spoke on the passing of Professor Lash Miller and feelingly outlined his past career and affiliation

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with the local platers and stated the doctor was the means of starting the first Toronto branch chemistry class. Allan Byers gave his report on the Dayton Convention which was as good as any report ever heard. Jack McLean and John Acheson also spoke of the convention as being one of the best.

Meeting adjourned at 10:45 P. M.

JAMES S. CAIRNS, *Secy.*

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**Bridgeport Branch** held its regular monthly meeting Thursday, September 5, 1940, at the Stratfield Hotel with President John E. Charleson presiding.

Mr. Frederick A. Infield, General Electric Company, Schenectady, New York, applied for membership as an active member.

Mr. Lloyd E. Barnes, 230 Stratford Avenue, Bridgeport, was elected as an associate member and Mr. William Oliver Leclair, Box 525, Nichols Ave., Stratford, was elected as an active member.

Professor Baker of the University of Michigan at Ann Arbor, Michigan, has been suggested by the Bridgeport Branch as Chairman of Papers Award Committee.

Mr. Herman Braun made and the motion was seconded by Mr. William A. Ehrencrona, to have Mr. W. G. Stratton made an Honorary Member of the Bridgeport Branch. The Branch feels that Mr. Stratton, being elderly and retired from industrial relations, had when much younger donated much of his time and experience to the welfare of the Society as a whole. It must be remembered that Mr. Stratton was Vice-President of the Supreme Society, when the Convention was held at Dayton, Ohio, in 1915. He has always attended our meetings here at Bridgeport and we want him to continue to do so. Many honors to a grand man.

Mr. Harry Haven has been suspended for the non-payment of dues.

Mr. Clarence C. Helmle stated he has made up a list of speakers for our Branch during the coming months. Our Branch, although small, compared to some of the other Branches in that it always takes keen interest in subjects pertaining to finishing and we spare no time or money to make sure our meetings are interesting to all who attend. Members of other Branches and Engineering Societies please take notice as you will find that these talks we have are very unusually interesting and you will all be cordially welcome to attend.

President John E. Charleson turned the meeting over to our librarian, Mr. Clarence C. Helmle, who is in charge of our Educational Sessions. The topic was "Hydrogen in Steels and their reaction in Plating." A good discussion was had on this with Mr. Ralph McCahan taking a part on "Cleaning Zinc Base Die Castings."

JOSEPH G. STERLING, *Secy.*

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**Cleveland Branch** regular meeting was called to order by President P. R. Lyons at 8:30 P. M.

It was moved by Mr. Thompson that John A. Vignos be elected as an associate member.

Mr. Singler, chairman of the entertainment committee started a discussion, and told the members if they only expressed their wishes he would try to give them what they would like.

Motion made by Mr. Ott and seconded by Mr. Morrow that a party be held at some other place than the Cleveland Hotel. A request was made for a rising vote which resulted in 14 for and 6 against.

Mr. Singler promised to have something worked out and ready for our next meeting and would go into con-

THE Capitol Brass Works Division of Bohn Aluminum & Brass Corp. makes the kind of plumbers' brass goods that helps to bring chrome-plated beauty to modern kitchens and bathrooms. The metal cleaning operation prior to plating involves some special problems, one of which is the removal of the buffing compound used to polish the brass castings.

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*Chemicals*

ference with Mr. Ott and committee members.

A reading of the financial records was then made.

Mr. Svenson, Chairman of the Membership committee, made an appeal to the members for help in increasing membership and discussed some plans he had for the future.

Mr. R. O. Hull made an announcement of registry being made for a course being conducted by himself at the John Huntington School for the fall term, the subject being Electroplating. The cost of this course is within reach of all of the members and any others desiring to attend.

Mr. Singler then discussed the coming 1942 convention and plans for bringing it to Cleveland. He thought it inadvisable to get started on some phases too soon.

Mr. R. O. Hull, of the Electroplating Division of the duPont Co. was then introduced by our Librarian John Honnecker as the speaker of the evening.

Mr. Hull is a very capable speaker and lecturer and he discussed with the aid of slides a number of interesting phases and problems of the plater in the use of electric current in electroplating. He also passed around plated samples to illustrate his talk.

His presentation was very well received and the members present took with them some interesting new information.

Mr. John Honnecker in his capacity as librarian announced that for the coming October meeting we would hear Mr. C. E. Ford of The National Carbon Co. of Cleveland give a discourse on the application of powdered carbon to electroplating.

FRANK J. OPATRNY, *Secy.-Treas.*

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**Newark Branch** held its regular meeting Friday evening, September 6th, at the Club Room of the Hotel Douglas, Newark, N. J. The meeting was called to order at 8:30 P. M. with President William T. Maguire presiding.

Mr. Louis Donroe, our Librarian, conducted a Question Box. One of the principal questions was: What advantage has a Rectifier over a Motor Generator Set? Mr. A. P. Munning who is quite an authority on rectifiers told us of his experience of investigation into the rectifier field. To his belief it will be a long time before rectifiers will supplant motor generator sets in plating plants. He stated that they are used successfully in small units up to about 200 amperes in quite a number of the smaller plating rooms, such as small jewelry shops but that for higher current densities the motor generator set has proved far superior and more satisfactory.

Thirty-two members were present. Meeting adjourned 10 P. M.

GEORGE WAGNER, *Secy.*

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**Pittsburgh Branch** held its first fall meeting Friday evening, September 6th, at the University Club.

The following officers were elected for the ensuing year:

Mr. S. E. Hedden, President; Mr. H. F. Saylor, Vice-President; Mr. F. R. Keller, Secretary-Treasurer; Mr. G. A. Jersey, Mr. Glenn Herring, Mr. M. A. Pederson, Board of Managers; Mr. R. A. Dimon, Librarian.

The following men were appointed by Mr. Hedden:

Mr. Glenn Herring, Chairman of Entertainment Committee; Mr. R. O. Hummel, Chairman of Membership Committee.

The date and place of meeting this year was changed to the first Thursday of each month, in the University Club.

# EGYPTIAN

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**AIR-DRY CLEAR LACQUERS** for use on sheet metal which is later to be formed into the finished article... Excellent adhesion to brass, aluminum, lead, copper, oxidized copper and steel. Flexibility which will withstand severe bending... Full gloss and brilliance which dress up a product to that final eye appeal. Egyptian Flexible Clear Lacquers are tough and extremely durable and may be buffed after forming if desired.

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An active discussion on the proposed speakers for the year was engaged in by everyone and a tentative program was suggested for the Librarian to work on.

Dr. C. J. Wernlund of the E. I. du Pont Company read a paper on "The Absorption of Copper into Zinc Die Castings" as presented by Mr. Oplinger at the Dayton Convention.

I am looking for a young assistant who has had plating experience and some mechanical ability. The man would probably be paid by the hour to start although that would depend on his ability. We plate copper, nickel, and chrome on bumpers and have a production of 5000 per day. I will appreciate your suggesting anyone who might qualify for this job.

FRANK R. KELLER, *Secy.*

---

**Chicago Branch** held its 341st regular meeting September 14, 1940, at the Atlantic Hotel.

Messrs. Einar Olsen and Ben. R. Spiegel were elected to active membership.

Mr. H. A. Gilbertson was appointed Chairman of the 1941 Banquet and Educational Session, with authority to proceed as necessary.

Mr. C. Kocour announced that applications for an elementary plating chemistry class would be received; and cards were given out giving more details about electro-chemical course at Lewis Institute.

Our Librarian, Oscar Weickmann, gave a concise abstract of Mr. Oplinger's paper given at the Dayton Convention on the subject of preparing zinc die castings for chrome plating and subsequent enameling. Mr. Weickmann then found the following questions for discussion:

*Q. Polished malleable iron castings are hard to cover with chrome.*

A. If heavier nickel does not eliminate trouble, suggest using reverse current for few seconds in chrome tank.

*Q. What is be stmethod of preparing* 18-8 *stainless for chrome plating?*

A. Clean in special stainless steel cleaner, acid dip in 5% to 10% muriatic acid, then plate.

*Q. Will small amount of nickel in cadmium bath cause trouble when work is bright dipped in* 1% *nitric acid dip, using standard bath?*

A. One member said no trouble encountered. Another suggested chromic acid or peroxide dip.

*Q. What percentage of hydrogen does* "100 *volume*" *represent?*

A. 27.7%.

*Q. What is the best method of copper plating aluminum sheet stampings?*

A. Anodize, then remove portion of oxide film, then copper plate.

President Longfield called for a special rising expression of appreciation in honor of our member Rudy Hazucha, who this month celebrates his silver anniversary as a member of the A.E.S., having the unique distinction of attending every regular meeting in all that time. Mr. Hazucha then pleasantly surprised the large assemblage by announcing that the refreshments to be served immediately after adjournment were his expression of his appreciation of the many friendships made, and benefits received, during the past 25 years. To Rudy go good wishes from all of us.

ED LANZ, *Secy.*

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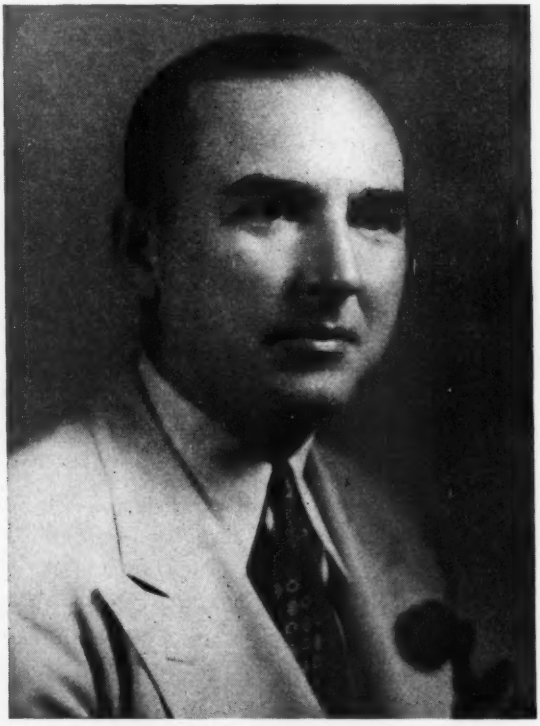
## DETROIT BRANCH NEWS

The Detroit Branch started the 1940-41 season by having one of its members, Mr. H. W. Kennedy of E. I. du Pont de Nemours Corporation, give a talk on "The Importance of Chemistry and Chemical Control to Electroplating." Mr. Kennedy brought out that chemistry had aided the plater by (1) developing brighteners for nickel, cadmium, zinc, and copper baths to give brighter deposits, (2) wetting agents for lowering surface tension of solutions and reduce the tendency of hydrogen and other foreign particles to cling to the surfaces being plated, (3) means of controlling carbonates in alkaline solutions, and (4) methods of analyzing plating solutions in order that they may be kept at proper strength.

The movie entitled "Cavalcade of Chemistry," sponsored by duPont was then shown, giving the members a view of new developments such as lucite, nylon, and neoprene.

The next meeting of the Detroit Branch will be Friday, October 4th, and Dr. A. Kenneth Graham will be the speaker of the evening.



**GEORGE NANKERVIS**

One of Detroit Branch's most active and enthusiastic members.

Mr. Nankervis's success in connection with the Branch outings is too well known to need any comment. He is always willing to bear his share of the Social Activities of Detroit Branch.

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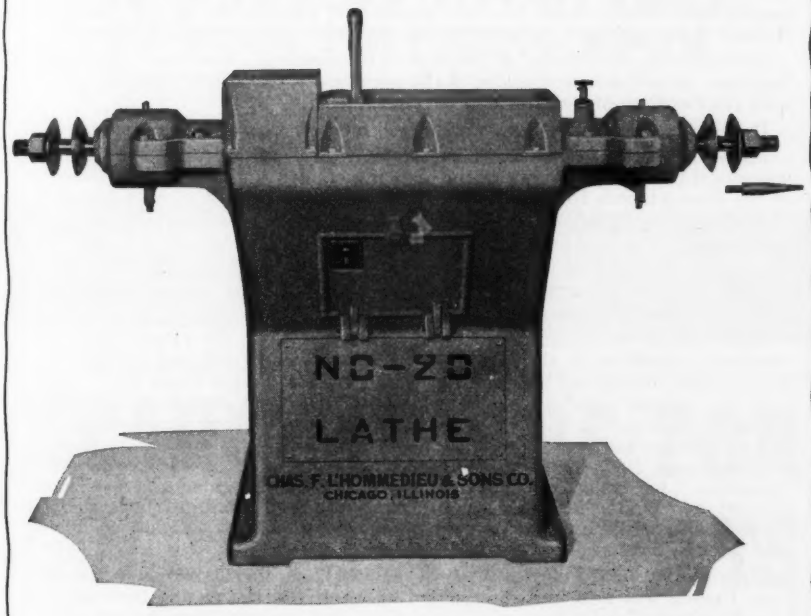


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# *Here and There*

New York Branch's regular meeting was held on Friday, August 23. In spite of midsummer heat there was a good attendance.

After the usual routine business was disposed of, President Fulforth spoke briefly on several matters concerning the future welfare of the Society including the drive for new members and the program for the coming year, outlining the duties of the several vice-presidents of the Supreme Society and their contacts with the branches. The Executive Secretary made a strong plea for more papers, particularly from foremen platers for publication in the REVIEW. Several of the members presented problems which were thoroughly discussed.

Refreshments were served at the close of the meeting. President Liguori and Secretary MacStoker and many of the members present held informal chats with the Supreme officers during the refreshment period.

It was our first visit to a regular branch meeting since the convention.

Members of other branches visiting the "big town" will be assured of a hearty welcome if they drop in at one of the regular meetings of the New York Branch at the Pennsylvania Hotel on the second and fourth Fridays of each month.

Thanks boys, we enjoyed the visit. We'll accept the invitation to come back again soon.

## BRIDGEPORT OUTING

Genial Joe Sterling acted as the welcoming committee on Saturday, Sept. 14, at the outing of Bridgeport Branch at Trumbull, Conn.

There was a smaller attendance than usual but what the picnic lacked in members was offset by the manner in which the crowd enjoyed themselves. A novel idea introduced by Clarence Helmle called "Monte Carlo Day" kept everyone excited, especially the ladies. If Jack Harper hadn't tampered with the wheel (like loading dice, things might have been different and John Oberender might not have lost eighty-five thousand "dollars." Money was no object at Bridgeport, "five-hundred-dollar bills" were as plentiful as the so-called "gamblers" that collected them. Anyway it was a great game and everyone enjoyed it. Walter Meyer, Derick Hartshorn, Fred Norgreu, Jack Barry, Gene Phillips, Bill Ehrencrona and others were exhausted after the horse shoe pitching finals.

Mr. and Mrs. Fred Fulforth came all the way from the Quaker City. Waterbury Branch was also well represented as were New Haven and Springfield. Vice-President Candee from the Brass City laid back his ears to the clam chowder, sandwiches and coffee. We all did. They were good too. George Hogaboom and Bill Flaherty came in together. We were glad to see both of them looking so well.

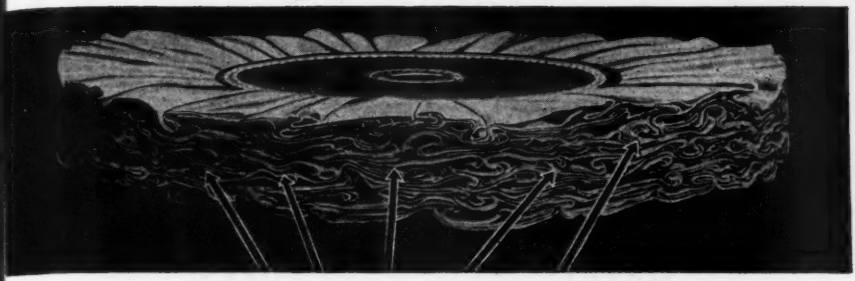
A very fine dinner was served after the athletic events. We wish we could have stayed to enjoy the spread, but there is much work to do now that the Branches are starting to function after the summer vacation. We enjoyed meeting the Bridgeport boys again, their outing is always one of the best. The friendly spirit behind it all makes one's visit a pleasant memory.

## NEWARK BRANCH

Newark Branch annual outing was held at Vogel's Grove, Union, New Jersey, on Saturday, September 7. There was a good attendance. John Kotches had charge of the eats, assisted by Roy Stout, George Reuter acted as bartender, Paul Oldam attended to the sports program while Horace Smith saw that everyone had a good time. George Wagner, the Newark Branch secretary, handled the receipts.

The ladies were there in full force under Mrs. Smith's careful "chaperonage." The weather was all that could be desired which helped to swell the attendance.

It looked like a meeting of the National Convention with Messrs. Fulforth,



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Candee, and Sievering, all members of the Executive Board, being present. Incidentally there was much informal business discussed.

Members of other branches were present from Philadelphia, New York, Springfield, Waterbury, and Bridgeport. A number of visitors were present also. Social events like this always present a fine opportunity to increase the branch membership.

We missed Phil Sievering at the outing. Mr. Sievering has not been feeling well for the past few months.

It's a pleasure to have a share in all the social activities as well as the regular meetings of Newark Branch. Thank you boys, best wishes for a successful season.

## VISIT TO ANDERSON

After three years we paid Anderson branch a visit, attending the regular meeting on Tuesday, September 10.

We were met at the station by Mr. Onkson and Mr. Oyler. The afternoon was spent at Guide Lamp Company's plant where our good friend Robert Wagner is supervisor of plating. Mr. George Onkson is in charge of Processes and Mr. Rex Oyler, secretary of Anderson branch, is the chief chemist. The tremendous volume of work being plated can be better imagined than described when we realize that 50,000 die-cast, 50,000 steel and 65,000 brass parts are plated each day, most of these parts being polished. High speed copper is used previous to the bright nickel and chrome plate operations.

At the Delco Remy plant, Wilhelm Castell takes care of the Process Department and Charles Hauri, president of Anderson Branch, is foreman plater. We get some idea of their production from the following figures:

Barrel zinc, 6 to 8 million small to medium parts per day.
Conveyor zinc, 20,000 small to medium parts per day.
Cadmium barrel, 4 million small to medium parts per day.
Barrel nickel, 150,000 small to medium parts per day.
Barrel tin, 150,000 small to medium parts per day.
Polish, nickel, and chrome, 50,000 small to medium parts per day.

Anderson branch always has a supper in connection with the monthly meetings which are held at the Y. M. C. A. The speaker on this occasion happened to be Mr. P. A. Martinson, C. E. of the Johns-Mansville Company, his subject being "Celite." A moving picture was used to illustrate the subject which made everything very interesting. Many questions were asked at the close of the meeting. Mr. Martinson showed his familiarity with the subject by satisfying all those who wished to know more about this wonderful product particularly as it relates to plating processes.

We spent a couple of days in Indianapolis visiting various plants and job shops relative to the reorganizing of a branch there. The sentiment in favor was strong. Many new industries have come to Indianapolis since the branch there folded up several years ago.

Our visit to the Indiana cities on this occasion was prompted by a letter sent to the Executive Board by Mr. Walter Binai of the Mallory Company suggesting the reorganizing of the branch. The Executive Secretary was asked to investigate, hence our visit. When the matter was mentioned at the Anderson Branch meeting, the members felt that if the neighboring city decided that a branch there could be successfully maintained that they would give the new branch every cooperation in getting started. This fine fraternal spirit is typical of the Anderson boys and is deeply appreciated by those interested in the present plans.

We are particularly fortunate in having Mr. Walter Binai of the Mallory Company to take care of the preliminaries previous to the decision of the Executive Board. He gave the writer every aid possible during his brief stay, using his car to make the rounds of the shops and industrial plants.

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*Please mention* THE MONTHLY REVIEW *when writing*

Unfortunately, we missed seeing Dr. Cotton of Delco Remy. We understand, however, that the Dr. is feeling okay.

We met Mr. C. D. Cleaver who is still keenly interested in the A.E.S. in spite of his heavy responsibilities at Guide Lamp. Mr. Cleaver used to be a very regular attendant at our national conventions.

We also ran across another "old timer," Mr. Hennessey of Climax Machine Company who was a former president of Indianapolis branch. He is strong for a renewal of activities in his home town.

We had a delightful visit in both cities. We like Indiana's friendly spirit. To all those who made our visit so pleasant including Messrs. Onkson, Wagner, and Oyler of Anderson and Mr. and Mrs. Binai of Indianapolis, we wish to extend our hearty thanks.

## ST. LOUIS BRANCH ANNUAL OUTING

For several years St. Louis Branch has held its annual picnic at Belleville, Ill. This year however, New Athens, Ill., was the spot chosen and on Sunday August 11, in spite of the rain, the members and friends of St. Louis Branch with their wives and families gathered for the party.

Louis Hoffmister made all the arrangements. Ed Musick acted as Master of Ceremonies and took care of the sporting events. There was baseball, cork ball, horse shoe pitching and, after that, races of all kinds for young and old. Prizes for the winners of these events were donated by our good friend Bert Daw. Thanks, Bert, for your help in making the picnic a success.

Among those present, in addition to the persons mentioned, were Mr. H. H. Williams and family, all looking well. Our "young friend" and poet, Hedley Richards, was there. We found him talking to Mrs. C. Pinkerton, who the writer found out is somewhat of a poetess herself. Ralph Kells and wife were there and entered the reel dance. Herman Struckhoff and family arrived late.

John Vogt and wife were there with a friend. John didn't dance much until they played a six step waltz, then you should have seen him step. "Nice going, John."

Ed Musick, besides dancing with the grandchildren, did some fancy stepping with Mrs. McGinley. "Didn't know you could jitterbug, Ed."—E. Guyott and bride seemed to be on their honeymoon.—A. Barth and family were having a good time.—Joseph Humbrecht had a chicken dinner and played cork ball to digest it.—Leo Freihaut and his two sons were there and won some of the prizes.

It was a most successful outing, at the close of which everyone went home tired but happy.

C. T. McGINLEY, *Secretary*

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**Don't forget the Platers' Outing at Leacrest, Bethlehem, Conn., Saturday, Sept. 28, 1940.**

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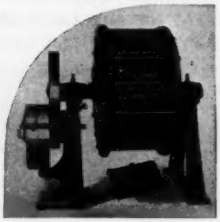

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# *The Abstract Section*

CHARLES C. CONLEY, *Chairman, Program and Educational Committee*

**Experimental Proof for a Secondary Process in the Separation of the Metal on the Cathode in the Electrolysis of Complex Salts.** By A. GLAZUNOV, O. STAROSTA, and V. VONBRASEK. *Z. physik. Chem.* **A185,** 393-9 (1939). Fine glass fibers were fastened to the surface of a polished copper plate; this was then made the cathode in a cyanide plating bath which was electrolyzed for 15-50 sec. at 1 amp./sq.dm. (9.3 amp./sq.ft.). Microscopic examination of the fibers showed them to be covered with a thin film of copper. It is suggested that the primary process is the discharge of a complex cation; this uncharged particle may then migrate a short distance before the second decomposition process deposits the metal. In this way, metal may be deposited on a non-conducting surface in close proximity to the region of primary discharge.

T. H. DUNKELBERGER
*Chemical Abstracts* **34,** 3993 (1940).

**An Accelerated Anodic Treatment (of Aluminum) in a Chromic Acid Solution.** By Z. A. SLEPUKHINA. *Aviapromyshlennost* **1939,** No. 1, 35-40; *Khim. Referat. Zhur.* **1939,** No. 6, 84-5. The protective properties of the oxide film obtained from solutions containing 3% $CrO_3$ (Bengough's method) 5%, and 9.5% were compared; best results were obtained from the 9.5% solutions. The optimum temperature was 37° C. (98° F.). The change of time for increasing the potential (from 0-40 v.) from 2 to 5 min. did not affect the quality of the oxide films, but the slower method is to be preferred because it increases the potential more evenly over the surface. With a 35-min. treatment in a 9.5% $CrO_3$ solution with a c.d. of 0.27-0.37 amp./sq.dm. (2.5-3.4 amps./sq.ft.) (instead of 0.16-0.18 amp./sq.dm. according to Bengough) films are obtained which surpass the technical requirements for stability. Slepukhina's method produces a film with better anti-corrosion and paint-base properties and saves 41% in time.

W. R. HENN.
*Chemical Abstracts* **34,** 3993 (1940).

**Galvanizing Methods and Surface Protection of Zinc Layers and Zinc Alloys.** By H. BARMANN. *Metallwirtschaft* **18,** 743-6 (1939). Progress in the field of electrolytic galvanizing is outlined. Properties of zinc coatings obtained by various types of electrolytic baths are discussed. Protective films on zinc coatings and zinc alloys obtained by a chromatizing treatment are discussed. 19 references.

C. B. JENNI.
*Chemical Abstracts* **34,** 3993 (1940).

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### NEWS ITEM

The Hanson-Van Winkle-Munning Company, Matawan, N. J., manufacturers of electroplating equipment and supplies, are expanding plant facilities. Due to the unprecedented demand for their electroplating equipment, they have started construction on a new addition to their plant, 66 ft. x 39 ft., built of steel and hollow tile, with concrete floor. This building will house a 10-ton crane.


# Packer-Matic Automatic
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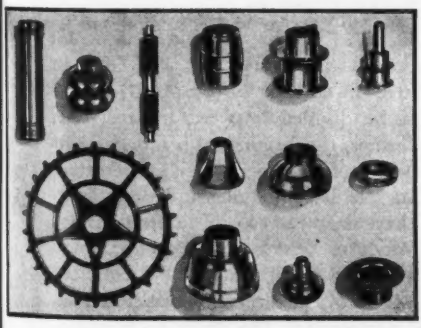

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**Saving in Material in the Production of Nickel Plate.** By E. WERNER. *Korrosion u. Metallschutz* **15,** 400-3 (1939). The importance of bath composition and bath control for the economic production of good nickel plate is discussed.

LEOPOLD PESSEL.
*Chemical Abstracts* **34,** 3182 (1940).

**Aluminum (Bus Bars) for Electrolytic Alkali-Chloride Plants.** By G. MEYER. *Aluminum* **21,** 333-4 (1939); *Chemical Abstracts* **34,** 3182 (1940). In this corrosive atmosphere, aluminum bus bars, replacing copper, have given no trouble since being installed in December, 1937. Joints were welded, and copper-clad aluminum sheets were used where copper-aluminum connections were necessary; joints were protected by lacquer.

ERNEST H. LYONS, JR.

**Anodic Behavior of Tin.** By HIDASI ITO. *Nippon Kuzoku Gakkai-Si* **4,** 21-6 (1940); *Chemical Abstracts* **34,** 3182 (1940). In acid tin (sulfate) solutions, as little as 0.5% copper in the tin anode, causes passivity and copious evolution of oxygen. Bismuth up to 10% does not give any marked effect on the passivity, and less oxygen is evolved than at pure tin anodes. The solution next the anode seems to contain no copper or bismuth.

ERNEST H. LYONS, JR.

**Cathodic Evolution of Arsenic in Electrolytes Containing Zinc.** By L. CAMBI and G. C. MONSELISE. *Rend. ist. lombardo sci.* **69,** 392-6 (1939); *Chemical Abstracts* **34,** 3182 (1940). Cathodic reduction of arsenic in acid containing zinc sulfate is inhibited by magnesium or aluminum ions and pyridine, owing to formation of a cathode film composed of pyridine and basic salts. Pyridine, magnesium, aluminum, manganese, and manganese plus pyridine have little or no effect when present separately.

BRITISH CHEMICAL AND PHYSIOLOGICAL ABSTRACTS.

**The Influence of Organic Compounds on the Electrodeposition of Nickel.** By ERNST RAUB and MAX WITTUM. *Z. Elektrochem.* **46,** 71-82 (1940). About 100 organic compounds were examined for their effect in brightening the deposits of nickel obtained in the electrolysis of a $NiSO_4$-$NiCl_2$-$H_3BO_3$ bath. Aliphatic compounds can be divided into two groups, viz., strong and weak brighteners. With the former, the brightness is independent of the thickness of the deposit, the presence of impurities can be detected, there is a marked increase of polarization, the hardness of the deposit is increased and its ductility decreased, and there is an increase of internal strain. Proteins, formaldehyde, acetic acid, and thiourea belong to this group; these are either colloidal or polymerize readily to form substances of a colloidal nature. With weak brighteners the brightness of the electrodeposit decreases with increasing thickness, impurities are not evident, the effect on hardness and ductility is small, and there is a low sensitivity to large amounts of the added substances. Alcohols, higher aldehydes, polyhydrin alcohols, e.g. glycerol and carbohydrates, fall into this category. The division of aromatic compounds

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into analogous groups is less marked; naphthalenesulfonic acids and their alkyl and aryl derivatives are good brighteners, but phenols and amino compounds are not. Naphthols have a brightening effect, but they weaken the mechanical properties of the deposit; certain sulfur compounds, e.g. methylene blue, have a similar influence. (A translation of this paper may be found in *Metal Industry* **38,** 206, 315, 429 (1940)—E. H. L.)

S. GLASSTONE.

*Chemical Abstracts* **34,** 3182 (1940).

**Improved Silver-Plating Baths.** By R. LIEBETANZ. *Oberflachentech.* **17,** 25 (1940); *Chemical Abstracts* **34,** 3183 (1940). The customary carbon disulfide brightener is good only for very thin silver deposits, and even these are not uniform. Derivatives of thiocarvamic acids which do not develop ammonia are recommended for superior brightness and thicker deposits. Recommended baths are:

| | *Bath* № 1 | *Bath* № 2 | *Bath* № 3 |
|---|---|---|---|
| Silver Cyanide, AgCN | 25 g./l. | 25 g./l. | 25 g./l. |
| Potassium Cyanide, KCN | 45 g./l. | 50 g./l. | 45 g./l. |
| Potassium Carbonate, $K_2CO_3$ | 20 g./l. | 50 g./l. | 20 g./l. |
| Brightener | 45 g./l. | 0.5 g./l. | 20 g./l. |

Temperature 27° C. (81° F.); c.d. 0.6 amp./sq.dm. (5.6 amp./sq.ft.).

Brighteners: Bath № 1, urea, thiourea, or acetyl thiourea; Bath № 2, monomethyl ammonium salt of monomethylthiolthionocarbamic acid; Bath № 3, potassium thiocyanate, KCNS. Baths should stand 2-3 days before using. For Baths № 1 and № 2, the brighteners may be thiosemicarbazide, dimethyl ammonium salt of dimethylthiolthionocarbamic acid, monoethyl ammonium salt of the monoethylthiolthionocarbamic acid, or similar substances.

ERNEST H. LYONS, JR.

**The Cracking of Chromium Plate.** By S. M. KOCHERGIN. *J. Applied Chem.* (U.S.S.R.) **10,** 1364-5 (1937); *Chem. Zentr.* **1938, I,** 4715; *Chemical Abstracts* **34,** 3184 (1940). Cracks in chromium plate on phonograph record matrixes were due to plate thicknesses of more than 3-4u (.000117-.000156 in.).

ERNEST H. LYONS, JR.

**Barrel Finishing of Metal Products — Sodium Silicate Application.** By H. LEROY BEAVER, *Product Finishing,* August 1940, 34-39. Sodium silicate is used with soaps as an alkaline "builder" and also has properties as a detergent. Also it is stated to rinse better in cold water. Most important use of silicate is in inhibiting alkaline attack on metals like zinc, aluminum, antimony, tin, etc., probably due to insoluble metal silicate formed at surface. Figures are given on solubities of silicates in hot and cold water. Typical formula for use of silicates is as follows:

| | |
|---|---|
| Tallow Base soap — 42 liters | 66% |
| 57% Light Soda Ash | 20% |
| 1.2 silicate of soda | 14% |

PHIL J. RITZENTHALER

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**NORTON COMPANY, WORCESTER, MASS.**

G-101

**NORTON ABRASIVES**

**Metal Coloring Theory and Practice.** By JOSEPH B. KUSHNER. *Product Finishing*, August 1940, p. 26-32, Part 8. **Coloring of Aluminum.** Article discusses the two primary means of coloring aluminum (1) by precipitating other metals and their compounds on aluminum by chemical or electrochemical means. (2) absorption into aluminum oxide. Formulas for greys, blues, and blacks are given. Black nickel plating solution will produce black on aluminum. Imitation bronze is also given: $KmnO_4$, 3½ oz., $CuSO_4$, ½ oz. water 1 gal. Use hot. Immerse work till desired shade is obtained. Very interesting feature of article was data on obtaining interference colors on aluminum, similar to "color plating" by anodic treatment in saturated solvent of disodium phosphate.

PHIL J. RITZENTHALER

**Plated Coatings for Protection of Zinc Alloys.** By HILDEGARD BARMANN. *Z. Metallkunde* **31**, 284-7 (1939); *Chemical Abstracts* **34**, 4995 (1940). All the usual zinc-base alloys can be plated with copper, nickel, chromium, or brass, but thick plates are necessary if corrosion-resistance is desired. Thin plates are too porous. Photographs showing the effects of running water on zinc-base die castings plated with nickel and chromium both with and without intermediate copper or brass undercoats are included.

BRITISH CHEMICAL AND PHYSIOLOGICAL ABSTRACTS.

**Sulfamate Baths for the Electrodeposition of Metals.** By L. CAMBI and R. PIONTELLI, *Rend. ist. lombardo sci.* **72,** No. 1, 23-5, Cf. *Monthly Review, Am. Electroplaters' Soc.* **1940,** (July) 556. Experiments on the deposition of copper, nickel, and iron from sulfamic acid baths gave the following results: Perfectly microcrystalline copper deposits with c.d. between 0.01 and 0.1 amps./sq.cm. (9-93 amps./sq.ft.); 0.007-0.035 amps./sq.cm. (6-31 amps./sq.ft.) for nickel between 12 and 40° C. (54 and 104° F.) and a concentration of 1-2 moles/liter of nickel salt. For iron, 0.01-0.1 amp./sq.cm. (9-93 amps./sq.ft.), 17-50° C. (63-112° F.), 50-85 g./l.

ROBERT SIMHA
*Chemical Abstracts* **34,** 4996 (1940).

**Copper-plating Steel Cylinders for Mezzotint and Hard Stereotyping in Cyanide-Free Baths.** By N. A. MOMOTOV. *Poligraf. Proizvodstvo* **1938,** No. 1, 23-5; *Chem. Zentr.* **1938, II,** 2186. A review of the copper plating of iron in sulfate baths. Good results were obtained with a bath containing 23 g. $CuSO_4.5H_20$ per l., (3.1 oz./gal.), 53 g. oxalic acid per l. (7.1 oz./gal.), and 56 cc. (7.5 oz./gal.) 25% $NH_4OH$ with a c.d. of 0.8-1 amp./sq.dm. (7.4-9.3 amps./sq.ft.) and a temperature of 50° C. (122° F.).

M. G. MOORE
*Chemical Abstracts* **34,** 4996 (1940).

**Adhesion of Electrodeposited Copper Plate.** By A. V. SHEMANAEV. *Poligraf. Proizvodstvo* No. **6,** 27-8 (1939). The adhesion of electrodeposited copper to nickel-plated printing cylinders was studied. Various colloids were added to the bath in small amounts. Proteins and their decomposition products

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Grease, oil, breakdown products of brightening and wetting agents—these are among the "ghosts" that get into plating solutions and ruin many a plating job.

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(peptones) decreased the adhesion; gum arabic and dextrin had an insignificant effect. The action of the colloids varied with their concentration, there being a minimum concentration at which it had no effect. This minimum depends on the nature of the colloid. Adhesion to polished nickel was less than to rough nickel.

B. Z. KAMICH
*Chemical Abstracts* **34,** 3597 (1940).

**The Effect of Iron on Copper Plating in Acid Electrolyte.** By L. P. ADAMOVICH. *J. Applied Chem.* (U.S.S.R.) **12,** 1126-33 (1939); *Chemical Abstracts* **34,** 3597 (1940). For metals to be plated in an acid copper bath, a nickel undercoat (0.00012 in.), plated at a c.d. of 0.046 amps./sq.ft. for 30 minutes avoided deposition of copper by immersion. If the copper bath (27 oz./gal. $CuSO_4.5H_2O$ and 4 oz./gal. $H_2SO_4$) contained up to 5 oz./gal. iron ($Fe^{++}$), a c.d. of 0.14 amp./sq.ft. was used for 33-50 min. When the bath contained less than 2.5 oz./gal. iron, a c.d. of 0.19 amp./sq.ft. was used for 22-3 min. The copper deposits were 0.00025-0.00037 in. thick.

ERNEST H. LYONS, JR.

**Evaporation of Electrolyte from the Surface of the Bath.** By A. I. GAEV and N. A. BAKHAREV. *Tsvetnye Metal.* **14,** No. 3, 104 (1939); *Chimie & industrie* **42,** 827. A study of the surface evaporation of electrolytes used in the refining of copper and containing 151-240 g./l. (20.2-32 oz./gal.) $H_2SO_4$, 30.7-56 (4.11-7.50 oz./gal.) Cu, and 7.7-12.7 (1.03-1.60 oz./gal.) Ni. At normal atmospheric temperature (about 20° C.) (68° F.) and bath temperature of 45-50°, ordinary variations in the composition of the electrolyte have little or no influence on the rate of evaporation.

A. PAPINEAU-COUTURE.
*Chemical Abstracts* **34,** 3181 (1940).

**Savings in Material and Time in Electroplating.** By JOH. FISCHER. *Maschinebau-Betreib* **19,** 77-80 (1940); *Chemical Abstracts* **34,** 4996 (1940). Bright plating eliminates a finishing operation, gives greater hardness and greater resistance to corrosion and tarnish; the metal is deposited in oriented crystallites smaller than the wavelength of light, due to the addition agents. High c.d., which saves time and gives denser deposits, requires good conductivity, high concentration of metal ions, high molecular weight organic substances, presence of brighteners, high temperatures, or circulation of electrolyte. High concentration baths are more economical in spite of the higher cost of solution. The life of tools, gages, etc., is extended by hard chromium plating at high c.d. and temperature.

ERNEST H. LYONS, JR.

**Effect of Gas Bubbles on the Electrodeposition of Metals.** By ROBERTO PIONTELLI. *Rend. ist. lombardo sci.* **72,** 10-35 (1939). The formation of pits in deposited plates of bismuth, copper, iron, and nickel due to gas bubbles adsorbed on the surface of the cathode was studied. A theory is given and equilibrium conditions are formulated. Particular attention must

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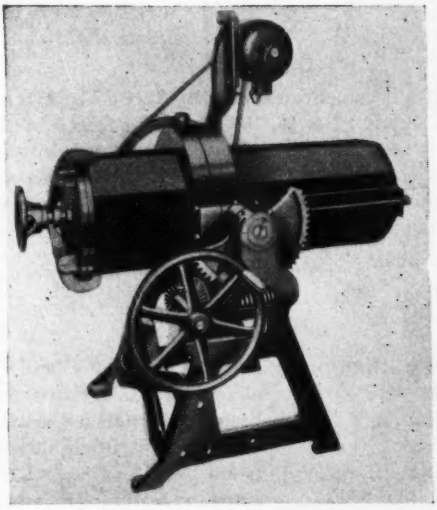

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be paid to the physical structure of the surface of the basis metal. Also, the presence of addition agents, other metals, etc., will affect the results. Experiments confirm the theory advanced. Numerous photographs are given.

ROBERT SIMHA

*Chemical Abstracts* **34,** 4996 (1940).

**The Action of Inhibitors in Electrolytic Baths.** By E. JIMENO and J. GRIFOLL. *Chim. ind., agr., biol.* **16,** 123-5 (1940). The influence of several inhibitors on the action of acids on metals was investigated by measuring the amounts of hydrogen developed. The overvoltage effect at the cathode increases with increasing inhibitor concentration, indicating a relationship between overvoltage and efficiency of inhibitors.

ROBERT SIMHA

*Chemical Abstracts* **34,** 4996 (1940).

**Preparation of Arsenic-Free Zinc.** By N. PETROV. *Trans. Inst. Pure Chem. Reagents* (U.S.S.R.) No. **16,** 109-12 (1939); *Khim. Referat. Zhur.* **1939,** No. 7, 72. Arsenic in a zinc sulfate solution is absorbed by ferric hydroxide, before the electrodeposition of zinc. The equation of the adsorption obeys Freundlich's formula. The permissible concentration of arsenic in the electrolyte is 0.00006-0.00008%. By purification with iron, Petrov obtained zinc with 0.0000015% of arsenic.

W. R. HENN

*Chemical Abstracts* **34,** 4671 (**1940**).

**A New Bath for Rhodium Plating.** By R. PIONTELLI. *Chimica e industria* (Italy) **22,** 61-2 (1940). Sulfamic acid solutions of rhodium are suitable for rhodium plating, as freshly prepared $Rh(OH)_3$ dissolves readily in this acid. This method is very easily applied; excellent, bright deposits are obtained from solutions varying in concentration from 3 to 50 g./l (0.4-6.7 oz./gal.) $Rh(SO_4NH_2)_3$ at c.d. of 20-1000 amps./sq.m. (1.9-93 amps./sq.ft.) and at 15-39° C. (59-102° F.). At and above 40° (104° F.) the deposit became cloudy.

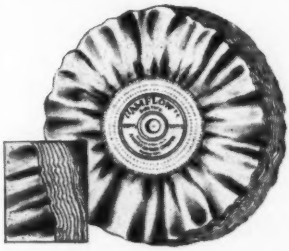
A. W. CONTIERI

*Chemical Abstracts* **34,** 4671 (1940).

**Investigation of Electroplating Baths.** By A. WOGRINZ. *Osterr. Chem.-Ztg.* **43,** 54-61 (1940). Plating baths can be divided into two groups: acid and alkaline. Acid baths are used for plating copper, chromium, iron, nickel, cobalt, tin, iron-nickel, nickel-cobalt, zinc, lead, and platinum. Alkaline baths, usually cyanide baths, are used for plating zinc, copper, brass, cadmium, silver, gold, and tin. A complete discussion and formulas are given to show the variation of the solution density with varying concentration of the principal salt and of addition agents. Methods of analysis are given for copper, chromium, silver, zinc, gold, and cadmium plating solutions. Density measurements are made with a hydrometer or Mohr-Westphal balance.

L. H. SEABRIGHT.

*Chemical Abstracts* **34,** 4342, (1940).



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# *Membership Report*

ELSWORTH T. CANDEE, *Chairman, Membership Committee*

## *To September 1, 1940*

### ELECTIONS

George T. Colton, 1220 Garfield Avenue, Albany Calif.
Active, San Francicso Branch
Richard Curi, 843 Talbot Avenue, Albany, Calif. San Francisco Branch
Ray Emerson Pepper, Box 55, Pemberton, Ohio Associate, Dayton Branch
Kenneth L. Martin, R. R. #5, Sidney, Ohio Associate, Dayton Branch

### APPLICATIONS

Francis H. M. New, R. F. D. #2, Taylors, S. C. Associate, Dayton Branch
J. E. Ledger, Bruce Products Co., Detroit, Mich. Associate, Dayton Branch
Charles Hunter Stoddard, 49 Detroit St., Hammond, Ind.
Associate, Milwaukee Branch
John W. Dobson, 761 Carroll Street, Brooklyn, N. Y.
Associate, Newark Branch
John Jos. D'Elia, 822 So. 17th Street, Newark, N. J.
Associate, Newark Branch
Joseph A. Fusco, 144 Norwood Street, Newark, N. J.
Active, Newark Branch
Anthony Jos. Fusco, 144 Norwood Street, Newark, N. J.
Associate, Newark Branch
Michael Tato, 25 Parkview Avenue, Belleville, N. J.
Associate, Newark Branch
Nathaniel Hall, c/o G. B. Hogaboom Co., Newark, N. J.
Associate, New York Branch
William Skene, c/o New Britian Mch. Co., New Britain, Conn.
Active, Waterbury Branch

### SUSPENSIONS

E. T. Piotrowski, Newark Branch
Oscar F. Carlson, Newark Branch
Nicholas Milo, Newark Branch
Eugenio Villacorta, Newark Branch
Stephen Goda, Newark Branch

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### MR. R. J. HAZUCHA IS HONORED

Rudy Hazucha, the popular and well known member of Chicago Branch, was honored by the members, at the regular meeting on Sept. 14. The occasion was to celebrate Mr. Hazucha's 25th anniversary as a member of the "Windy City" Branch of the A.E.S. His host of friends from coast to coast wish Rudy many years of health and prosperity.

# *Membership Campaign*

| BRANCH | May 1, 1940 | Change in Membership | Percent Change |
|---|---|---|---|
| Lancaster | 25 | +9½ | +38 |
| Cincinnati | 39 | +6½ | +16.7 |
| San Francisco | 19 | +3 | +15.8 |
| Cleveland | 69 | +10 | +14.4 |
| Toledo | 40 | +4½ | +11.2 |
| Rochester | 62 | +6½ | +10.5 |
| Grand Rapids | 52 | +5 | +9.6 |
| Boston | 79 | +7½ | +9.5 |
| Prov.-Attleboro | 38 | +3 | +7.9 |
| Springfield | 49 | +3½ | +7.2 |
| Dayton | 62 | +3 | +4.8 |
| Chicago | 225 | +6 | +2.7 |
| Anderson | 38 | +1 | +2.6 |
| Waterbury | 66 | +1½ | +2.4 |
| Milwaukee | 84 | +2 | +2.4 |
| New York | 102 | +2 | +2.0 |
| Philadelphia | 131 | +1 | +0.7 |
| Montreal | 23 | 0 | 0 |
| Los Angeles | 59 | 0 | 0 |
| Bing.-Syracuse | 22 | 0 | 0 |
| New Haven | 115 | 0 | 0 |
| Hartford | 45 | —½ | —1.1 |
| Detroit | 250 | —4 | —1.6 |
| Baltimore-Wash. | 49 | —1 | —2.2 |
| Buffalo | 57 | —1½ | —2.6 |
| St. Louis | 77 | —2 | —2.6 |
| Toronto | 67 | —2 | —3.3 |
| Newark | 125 | —5 | —4.0 |
| Pittsburgh | 34 | —2 | —5.9 |
| Bridgeport | 71 | —4½ | —6.3 |

NOTE: Honorary members are included with each Branch.

## FORMER I. T. & T. ENGINEER JOINS GREEN ELECTRIC CO.

W. Green Electric Co., Inc., 192 Broadway, New York, announces the addition to their staff of Mr. L. W. Reinken, electrical engineer, formerly of the International Telephone Development Company, who recently returned to the United States after eight years abroad, where he had been engaged in supervising the promotion of Selenium Rectifiers in England, France, Belgium, Sweden, Denmark, Norway, Spain, Portugal, Hungary, Switzerland, Italy and the Balkan nations. Mr. Reinken was one of the pioneers in the introduction of the Selenium Rectifiers and his long experience has given him an unequaled firsthand experience with this type of equipment.

The International Telephone Development Co. recently introduced the Selenium Rectifier in the United States after ten years of successful experience in other countries and recalled Mr. Reinken to utilize his experience for the American promotion.

W. Green Electric Co. was the first organization in the United States to appreciate the unique advantages of Selenium Rectifiers for electroplating. Consequently they developed a line of light, medium and heavy duty rectifiers under the registered trade name, SELECTRO-PLATER, incorporating the American made rectifier unit which uses the Selenium stack. The SELECTRO-PLATER has already gained wide acceptance as a source of low voltage current.

With the addition of Mr. Reinken to their staff, W. Green Electric Co. is in a position to deal with any current supply problems in the electroplating field, from the smallest bench or laboratory unit to the largest industrial installations.

## "HECTOR SEZ"

There was a goodly turnout at the Detroit Branch meeting, about 150 being present to start the '40-'41 season. Maybe they came to get "Red" Kennedy fussed at his appearance on the rostrum.

Phil Brockway must be trying for 100% attendance this season (it's too early for election bet payoffs). Carl Heussner missed the first one so can only run a close second to Phil in attendance records.

Our President, W. L. Pinner, should get a prize for effort. After taking the train and plane for some 650 miles, he arrives in time to declare the meeting adjourned.

The prize question from the question box: "What is Miss Nylon's telephone number?" Evidently there were some members awake during the movie.

## AMERICAN BUFF CORPORATION ANNOUNCES DEVELOPMENT OF TWO NEW BIAS TYPES OF BUFF

Its tremendously increased volume of orders has not interfered with the development by American Buff Corporation of three new and improved buffs. Two of these "All-Americans" are now being introduced to all American industries. They are the "Amflow" and the "Shurflow," both bias-type buffs. The "Shurflow" is provided with additional cutting power. Both are ventilated and air-cooled, especially desirable where heat is an important factor in buffing operations. Each is tested for balance and stamina, contributing a greater degree of efficiency.

The third new "All-American," as Mr. Sax proudly calls his line, is certain to arouse considerable enthusiasm in buffing circles. It has been undergoing the prescribed "working" test in several well-known plants prior to its introduction to the industries, generally. To date, the results have been gratifying, and it is expected that this new idea in buffs will be available for all industries, within thirty days.

Samples of the "Amflow" and "Shurflow" are available upon request. Merely write to American Buff Corporation, 228 North Clinton Street, Chicago.